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Miscellaneous Publication No. 779

1958

The Research Program of USDA . . .

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Agricultural Research Service

U. S. DEPARTMENT OF AGRICULTURE

Prepared in

Central Project Office
Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE
Washington 25, D. C.

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D. C. Issued November 1958

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HOW TO USE THIS PUBLICATION

A wealth of information is contained in this publication on the Department's research program. To tap its real resources, however, the reader must make full use of the guides to various aspects of these programs. These guides are:

- Commodity Guide, p. 73. Indicates the Divisions, Branches, and Laboratories that work on a commodity or group of commodities.

- Subject-Matter Guide, p. 79. Indicates the Divisions, Branches and Laboratories working in a particular area of subject matter.

- Locations Guide, p. 89. Indicates the Divisions, Branches and Laboratories that are conducting research in particular towns and States. Location of the entire program is visualized through use of the map on pages 44 and 45.

Use of the Commodity Guide is illustrated by the following question and its answer:

- What research units in the Department are working on wheat? Turn to the Commodity Guide p. 78, and find "Wheat." Under "Wheat" are given the code numbers of 27 units with work on this commodity. The first code number shown is 1.11. Reference to the table of Contents shows that 1.11 stands for the Crop Production Engineering Research Branch, Agricultural Engineering Research Division, Agricultural Research Service. The table of Contents also refers the reader to page 15 for a brief description of the program of this Branch.

Included in each of the sections describing the work of a Branch or Laboratory is a list of paired numbers that indicate where the work of the unit is done. The number on the left of the dash stands for a State, the one on the right for a town within the State. These location numbers are keyed to the ones preceding the names of States and towns in the Locations Guide. For example, 21-4 stands for Chillicothe, Texas.

This handbook provides only a generalized picture of the Department's 84 million dollar research program in the fall of 1958. More detailed information may be obtained on its 2,900 separate projects by making inquiry of the Central Project Office or of the Division Director or Branch Chief concerned. Because research programs are subject to changes in nature, location, and intensity, inquiry will become increasingly desirable the farther the reader finds himself from the date of publication.

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THE RESEARCH PROGRAM OF USDA
Organization - Coordination - Nature - Location

One man on an American farm today is producing about as much food and fiber as three men produced 50 years ago. In fact, production per farm worker has more than doubled since 1940. He produces as much food as three to four workers on a collective farm in the Soviet Union and vastly more than the farm worker in an underdeveloped country. Research, and an economy that puts research to use, has given our farmer power machinery, fertilizer, resistant varieties, pesticides, and other practices that increase the efficiency of his labor.

A worker in an American factory buys a loaf of bread, a quart of milk, a dozen eggs, and a 2-pound chuck roast with what he currently earns from an hour of labor. In 1940 it took half again as many hours of factory work to buy this food. In the Soviet Union it is roughly estimated that the factory worker must work more than 5 hours to earn enough rubles to buy this food. Agricultural research has meant a better diet at less cost for every man, woman, and child. It has meant new and higher quality products and wider and more efficient distribution. Competition in our free enterprise economy assures everyone a share in the better products that advancing technology makes available to us.

Forty percent of the consumer's dollar is now going to the farmer and sixty percent to the distribution system. Our 7.6 million farm workers are only one of the important groups that earn their living from agriculture. Ten million more are employed in processing farm products in the canneries, creameries, flour mills, packing plants and the like, and in such marketing activities as buying, selling, transporting, storing, packaging, wholesaling, and retailing these products. Six additional millions are employed in the factories that manufacture farm machinery, fertilizers, pesticides, and other farm supplies. Thus for every person engaged in producing food and fiber on the farm about two persons are employed in off-farm work. Agricultural research is concerned with how all of these workers can improve their efficiency and in doing so provide the American consumer with a better product at a lower cost.

Improved income for farmers and better food at lower cost for consumers are not the only objectives of agricultural research. It must find ways to control the weeds, insects, diseases, and nematodes that are hazards in production and distribution. During the years ahead in which our farm production exceeds the domestic demand, research will continue to develop ways of improving product quality and marketing efficiency and seek new uses and new markets for farm products. Looking farther ahead, our growing population will require more and more food. To meet this challenge research must find ways of getting more production from our limited land resources. Continuing prosperity also depends upon maintaining and conserving our land, water, and forest resources.

Who Supports Agricultural Research?

Research to improve agriculture is financed with both private and public funds. More than 13,000 scientists are working on agricultural research because Congress and the State legislatures have made appropriations to support their work. A number of scientists probably equally as large are employed with private funds, largely by the industrial firms that manufacture machinery and supplies purchased by farmers and those that process and distribute farm products. Agricultural industry, as well as non-agricultural industry, finds it profitable to devote a considerable portion of its gross income to research.

Industrially supported research is principally concerned with the development of new and improved products and more efficient methods for the production and distribution of those products. Such research is a good investment for large corporations whose customers want a superior product. Farmers want and will pay for better fertilizers, pesticides, and machinery. Household consumers want and will pay for higher quality and more convenience in food and clothing.

Publicly supported research is principally concerned with the problems of individual farmers, the many agricultural food processing and marketing firms and cooperatives that are too small to support their own research and the consumers of agricultural products. Such research is a good investment of public funds as its results will be used by large groups of people. The combined benefits to the many users of a research finding frequently have a value that is a hundredfold the expenditure for the scientific investigation that developed the new practice or product.

The dual structure of publicly supported agricultural research is a reflection of both Federal and State responsibility in this area. It recognizes the wide variety in topography, climate, and soil in our large Nation. Each State discharges its responsibility for agricultural improvement within its own boundaries but, at the same time, it recognizes interstate and State-Federal responsibility for agricultural improvement in the Nation as a whole. National improvement is promoted by Federal grants to supplement State support of agricultural research.

The State Agricultural Experiment Stations are independent agencies usually part of the land-grant college or university of the State. They are free to investigate such problems of local, basic, or general scope as are of interest to the people. On problems of regional or National scope, cooperative work usually is undertaken with other States and with the Federal Government.

The U. S. Department of Agriculture directs its efforts mainly toward problems of regional or National significance. It participates in regional research projects, investigates problems that occur in all or several regions, handles most international cooperation, and conducts basic work.

State Agricultural Experiment Stations

Approximately three-fifths of the publicly supported agricultural research is carried on by the State Experiment Stations. The groundwork for Federal-State cooperation was laid by the Hatch Act passed in 1887. The modest amount of Federal-grant funds made available to the State stations by that act have been increased by subsequent acts and now exceeds 30 million dollars annually. Federal-grant funds provide about one-fourth of the total support for the State-conducted agricultural research.

The Department's contribution to coordination of research among the State stations and between them and the Department is the specific responsibility of a Deputy Administrator of the Department's Agricultural Research Service and of the State Experiment Stations Division which he supervises. As part of the administration of Federal grants to the State stations, this Division participates in the planning and coordination of research among the States and between States and the Department of Agriculture.

Before research projects using Federal-grant funds can be initiated by a State station they must be approved by the Department. Federal-grant projects are submitted to the State Experiment Stations Division for review and approval. This review by a staff of specialists provides coordination of research by subject-matter areas. This staff of specialists also reviews all research line projects of the Department of Agriculture to facilitate coordination between State and Federal programs.

An annual visit is made by these specialists to each station where each project receiving Federal-grant fund support is reviewed with the project leaders and research workers. At most of the State experiment stations this review covers the entire research program without regard to source of financial support.

As part of the administration and coordination of research under the Federal-grant funds, the State Experiment Stations Division maintains records on over 12,000 Federal-grant and State-supported projects. A series of research summaries by various subject-matter fields, indicating the nature and purpose of projects supported with Federal-grant funds is published biennially.

More than 12 percent of the research funds available to the State stations are devoted to some 200 regional research projects. These projects are cooperatively planned by a technical committee composed of representatives of the Department and the State stations of a region. The portion carried out by each cooperator contributes to the broad objectives of the regional project and progress is reviewed annually by the technical committee.

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Often, the Department and one or more State stations are interested in solving a particular problem. In such cases--and there are hundreds of them--representatives of the interested agencies plan the work cooperatively and decide upon the portion each will undertake. These arrangements are provided for in cooperative agreements and memoranda of understanding.

There are frequent contacts between Federal and State scientists and among State scientists working on similar problems. In addition to those involved in the planning and conduct of cooperative and regional projects, many more occur at meetings of scientific groups and societies.

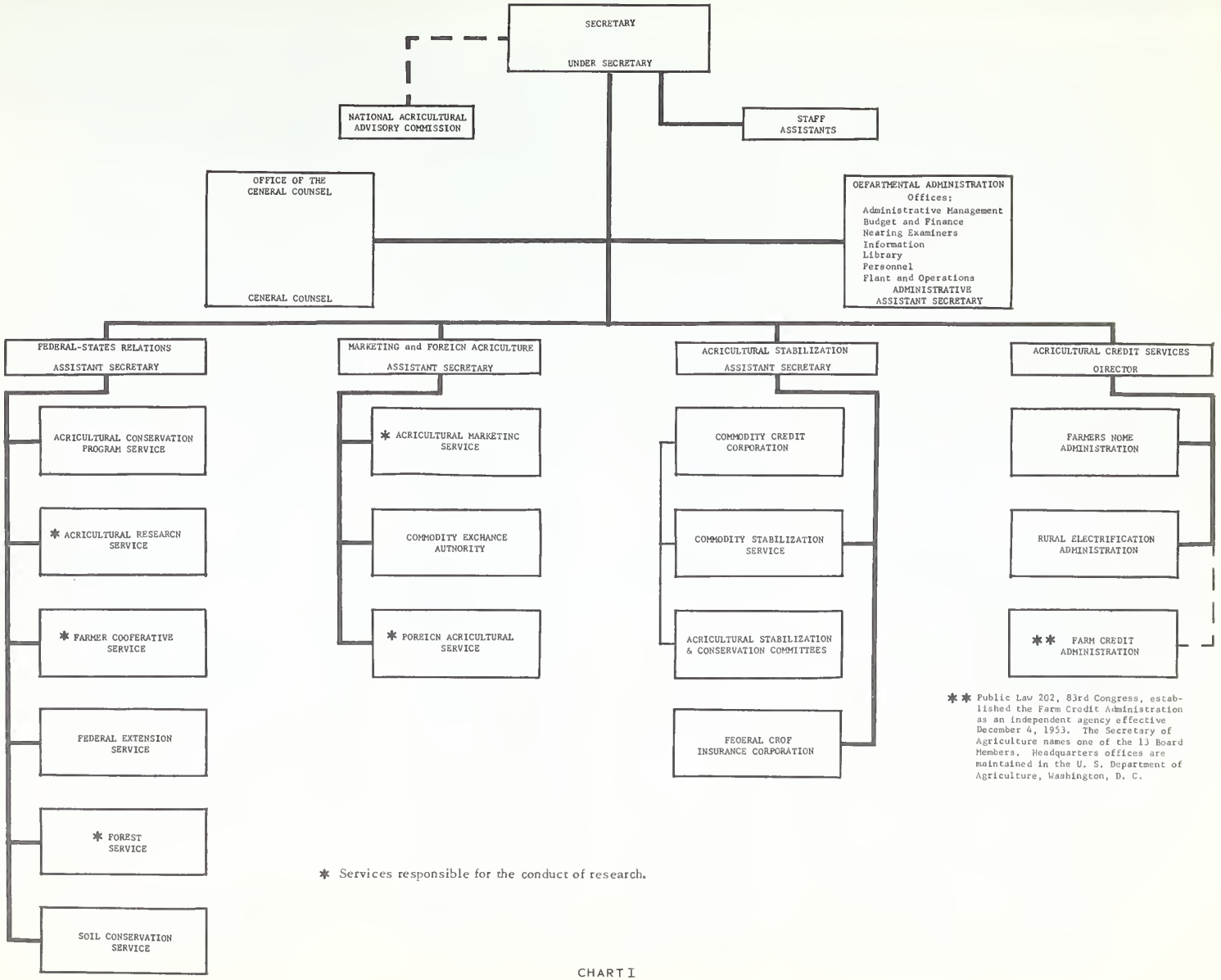
The experiment station in Hawaii and the university station in Puerto Rico are cooperatively supported in a manner similar to the State stations. In addition, a second station in Puerto Rico and stations in Alaska and the Virgin Islands have programs supported by Federal appropriations.

Departmental Organization for Research

The Secretary of Agriculture is responsible for the administration of research and the numerous other functions assigned to the Department by law. The delegation of these responsibilities to staff offices and 16 operating agencies is shown in Chart I. Five of the operating agencies have responsibility for the conduct of various aspects of the research program.

This research program may be broadly divided into five major areas: (1) Farm research, (2) Utilization research, (3) Home economics research, (4) Marketing research, and (5) Forest research. The first three programs are administered by the Agricultural Research Service, which has Deputy Administrators for farm research and for utilization research and a Director of home economics research, as well as the Deputy Administrator for experiment stations noted above. Most of the marketing research is administered by the Agricultural Marketing Service which has a Deputy Administrator for marketing research and statistics. Specialized marketing research dealing with problems of farmers' cooperatives is conducted in the Farmer Cooperative Service and research on foreign markets and competition is conducted in the Foreign Agricultural Service. Research on the production, protection, utilization and marketing of forest products is administered by the Forest Service and is the particular responsibility of the Assistant Chief for research of the Forest Service.

UNITED STATES DEPARTMENT OF AGRICULTURE



* Services responsible for the conduct of research.

** Public Law 202, 83rd Congress, established the Farm Credit Administration as an independent agency effective December 4, 1953. The Secretary of Agriculture names one of the 13 Board Members. Headquarters offices are maintained in the U. S. Department of Agriculture, Washington, D. C.

CHART I

Program Development and Coordination

Coordination of all research in the Department is delegated by the Secretary to the Administrator of the Agricultural Research Service. This responsibility includes examination and analysis of all research activities current and contemplated, review and approval of all projects or proposals prior to initiation, advice and consultation on planning with heads of agencies and reports and recommendations to the Secretary (Chart II). The organizational units that advise and assist him and the administrators of the several programs in overall coordination and program development include the Agricultural Research Policy Committee, 25 commodity and functional advisory committees, the advisory committee secretariat, the Agricultural Research Council, and the Central Project Office.

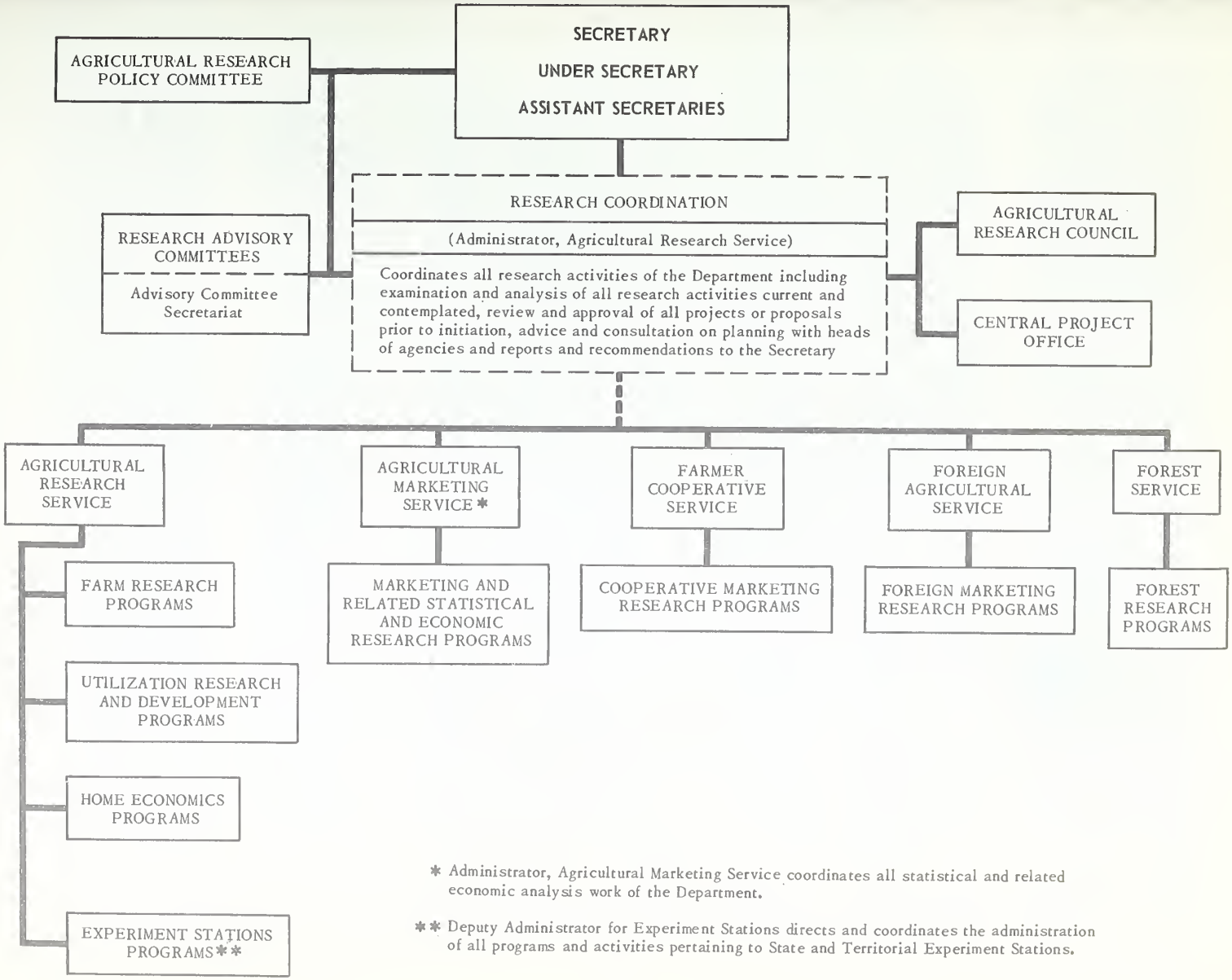
Coordination of all statistical and related economic analysis work of the Department is delegated by the Secretary to the Administrator of the Agricultural Marketing Service. This responsibility includes the reviewing and clearing of all forms, survey plans, and reporting requirements originating in the Department and requiring approval of the Bureau of the Budget.

Units that provide services of a staff nature to the research programs include the Department staff and administrative offices, such as the Office of Budget and Finance, Office of Personnel, Office of Information, Office of Plant and Operations, Office of the General Counsel, and the Department Library. In addition, the Office of Operations of the Agricultural Research Center provides services for research units carrying on work at that location.

Agricultural Research Policy Committee

New problems created by changing conditions require shifting of research effort. To serve its purpose most effectively agricultural research must meet the needs of the times. Social, educational, and economic forces, for example, have altered market demands for farm products and brought increased consumption of fruits and vegetables, meats, and milk. Improvements in transportation, handling, processing, and distribution have intensified some of these shifts. A dynamic research program involves periodic broad adjustments based on evaluation of trends and anticipation of emerging problems.

ORGANIZATION FOR RESEARCH COORDINATION AND PROGRAM DEVELOPMENT IN THE USDA


SECRETARY
UNDER SECRETARY
ASSISTANT SECRETARIES
AGRICULTURAL RESEARCH POLICY COMMITTEE
RESEARCH ADVISORY COMMITTEES
Advisory Committee Secretariat
RESEARCH COORDINATION
(Administrator, Agricultural Research Service)
Coordinates all research activities of the Department including examination and analysis of all research activities current and contemplated, review and approval of all projects or proposals prior to initiation, advice and consultation on planning with heads of agencies and reports and recommendations to the Secretary
AGRICULTURAL RESEARCH COUNCIL
CENTRAL PROJECT OFFICE
AGRICULTURAL RESEARCH SERVICE
FARM RESEARCH PROGRAMS
UTILIZATION RESEARCH AND DEVELOPMENT PROGRAMS
HOME ECONOMICS PROGRAMS
EXPERIMENT STATIONS PROGRAMS**
AGRICULTURAL MARKETING SERVICE*
MARKETING AND RELATED STATISTICAL AND ECONOMIC RESEARCH PROGRAMS
FARMER COOPERATIVE SERVICE
COOPERATIVE MARKETING RESEARCH PROGRAMS
FOREIGN AGRICULTURAL SERVICE
FOREIGN MARKETING RESEARCH PROGRAMS
FOREST SERVICE
FOREST RESEARCH PROGRAMS

* Administrator, Agricultural Marketing Service coordinates all statistical and related economic analysis work of the Department.

** Deputy Administrator for Experiment Stations directs and coordinates the administration of all programs and activities pertaining to State and Territorial Experiment Stations.

CHART II

The 11-member Agricultural Research Policy Committee (ARPC) authorized by Title III of the Research and Marketing Act of 1946, directs its attention to the broad adjustments needed to maintain a dynamic program. During the past 12 years, this Committee, which meets quarterly, had advised the Secretary and his research administrators on many aspects of the program. At its 44th meeting, held October 24, 1957, it prepared and approved the following summary of its advice up to that date:

Advisory committees can perform a valuable function in research program development. ARPC should concern itself with broad policy problems and should seek to improve the operation of commodity and functional committees as a means of identifying and selecting specific areas toward which the research program should be directed.

The objectives of agricultural research should be reviewed from time to time. Well-stated objectives are valuable in appraising the importance and in selecting for attention the specific problems that are important to the accomplishment of major objectives.

Adjustments in the current program to reach broad objectives involve more emphasis in several areas. Basic research needs to be expanded. Greater emphasis is needed on both basic and applied research that will lead to (1) new industrial uses for agricultural products, that are economically practicable, (2) improved marketing techniques and efficiencies in processing and distribution, (3) expanded domestic and foreign markets, (4) developing, maintaining, and objectively measuring product quality, (5) more effective use of food as a means of achieving human vigor and health, (6) balancing production and market demand and (7) improved basic information as a background for agricultural policies and programs.

Scientists who conduct the research work are the key to success. Every effort should be made to attract and develop the most able persons available and to provide them with the facilities, working tools, salaries and other employment conditions that will maximize their effectiveness.

Administrative leadership that achieves sound program development, coordination, economy in operation, and stimulation of imagination and initiative is essential to maximum effectiveness of scientific effort. Such leadership must also see that research results are promptly disseminated to those who can use them and that the public understands the objectives and values of the research program.

The interests of the public as a whole and those who are dependent on agricultural occupations for their income will be served best when we achieve the objective stated by Congress in the Research and Marketing Act, i.e. "To assure agriculture a position in research equal to that of industry."

Commodity and Functional Advisory Committees

In addition to the Policy Committee the Research and Marketing Act authorized additional committees to "assist in effectuating specific research and service programs." The 25 committees established by the Department are composed largely of representatives of groups that use the findings of research. Their advice is sought on suggesting specific problems to which research effort should be directed. Most of these committees meet annually for 3 days. Their functions are:

1. Acquainting themselves with the problems of producers, processors, distributors, and consumers, and presenting them for committee consideration.

2. Reviewing the current research and marketing service programs of the Department and recommending adjustments, including terminations, in the current program in order that available funds, personnel, and facilities will be used on problems of greatest importance.

3. Recommending new work or expansion of current work and indicating relative priority of such recommendations, when the current program is insufficient to develop solutions for important problems.

4. Developing a better understanding of the nature and value of the agricultural research program, explaining it to interested groups and organizations and encouraging the wider and more rapid application of the findings of research.

The areas of interest of these advisory committees are: Citrus and subtropical fruits; cotton and cottonseed; dairy; deciduous fruits and tree nuts; economics; farm equipment and structures; feed and forage; food distribution; food and nutrition; forest; grain; home economics; livestock; oilseeds and peanuts; potato; poultry; refrigerated and frozen products; rice; seed; sheep and wool; soils, water, and fertilizer; sugar; tobacco; transportation; and vegetable.

Supporting and assisting each advisory committee is a Departmental Working Group composed of representatives from each of the program activities

having an interest in the work of the committee. In preparing for advisory committee meetings and in following up to effectuate committee recommendations, these working groups develop procedures for a coordinated attack on problems that need attention.

Advisory Committee Secretariat

The men who serve as executive secretaries of the advisory committees are familiar with all aspects of the Department's research program and with emerging problems that need attention. They facilitate program coordination and prevent duplication of effort by arranging conferences of representatives of the several agencies that can contribute to the solution of a particular problem. They also keep the members of their advisory committees informed of developments of interest in the Department's research program during the periods between annual meetings.

Agricultural Research Council

Procedures for effectuation of policies that affect all of the Department agencies conducting research programs are the concern of the Agricultural Research Council. The council is composed of the ARS Deputy Administrators for experiment stations, farm research, and utilization research; the Director of home economics research; the AMS Deputy Administrator for marketing research and statistics; the Administrators of the Farmers Cooperative Service and Foreign Agricultural Service; the Assistant Chief for research of the Forest Service and the Secretary of the Agricultural Research Policy Committee.

The Project System and the Central Project Office

The Department's Uniform Project System provides a basic tool for administrative control of research activities, and for safeguarding against undesirable duplication of effort. Broad, continuing fields of research are formally documented, reviewed, and approved by appropriate officials. Specific undertakings within these broad fields are proposed in the form of clearly stated project descriptions.

The Central Project Office working within the framework of the Uniform Project System implements and facilitates the effective coordination of agricultural research throughout the Department. It assists in obtaining a well integrated research program by acting as a control center in the review and approval of research proposals. It examines all project proposals for adequacy of statement and refers them to any part of the Department doing related work. They are also reviewed by subject-matter specialists in the State Experiment Stations Division of the Agricultural Research Service because of their familiarity with the

agricultural research at the State stations and by the executive secretaries of research advisory committees. Comments of all reviewers are then recorded and later checked to see that differences have been reconciled before the project receives formal approval by the appropriate officials. It also provides an informative reference file of approved projects. Analyses of the Department's research program are conducted as an aid to effective administration.

Budget Development

Advisory Committee recommendations for new and expanded work can be effectuated in part as current lines of work are completed. While this may be done at any time during the year a systematic annual review of possibilities is made each April, following the advisory committee meetings. At this time, estimates are made of the additional funds that would be required to effectuate all of the work recommended by the advisory committees.

The process of considering these needs for strengthened or added research and balancing them against probable availability of funds takes place at agency, Departmental, and Bureau of Budget levels between April and January, when the President submits his budget to Congress. It continues in Congress from January until Departmental appropriations, including those for research, are made for each fiscal year which begins July 1. At the Departmental, Bureau of the Budget and Congressional levels the five research agencies present their budget estimates and evidence to support the need for the amounts included in the estimates.

Criteria for inclusion or exclusion of particular items during the budget process include other factors in addition to the relative need for the work. Consideration is given to whether this or related research is being done by State stations or private industry and whether the personnel, facilities, and research background and methodology that are available are sufficient to indicate probable success in a search for a solution to the problem.

Staffing the Research Program

Research accomplishment depends upon the intellectual contributions of the scientists who carry out the program. On one hand, considerable latitude for self-direction is essential. On the other hand, solving problems usually requires the coordinated application of knowledge from several scientific disciplines. Research administrators organize research work in a manner that will take full advantage of both individual initiative and imagination and teamwork.

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Obtaining and retaining individuals with the highly specialized competencies needed is difficult. Desirable changes in the direction of the research program are retarded when new types of competency are needed and when the competencies currently available would not be fully utilized in a re-directed program.

In the Department's program staffing procedures are largely determined by the personnel policies established by Congress and administered through the Civil Service Commission, the Departmental Office of Personnel, and personnel units in the several agencies.

Facilities for Research

Scientific work requires specialized laboratories, equipment, and methodology. Sometimes these can be best provided in central laboratories. Sometimes the work must be decentralized to locations where the required topography, climate, soil, plants, animals, or farm products are available for the conduct of particular investigations.

The national Agricultural Research Center at Beltsville, Md., with facilities for many different types of research, is an especially desirable location for basic research and research that requires teamwork on the part of several scientific disciplines. Currently, 680 Departmental scientists are located at this center while an additional 626 are located in Washington, D. C. There are 3,378 Department scientists working at 329 other locations throughout the country. These diverse locations provide opportunity for association of the scientific work with local and regional problems (see pages 44 and 45).

The speed with which new or expanded programs in particular fields may be undertaken is frequently limited by the availability of satisfactory facilities or equipment. In some cases, completely new laboratories must be designed and constructed before the needed research can be undertaken.

Research workers must also have ready access to scientific literature. The library of the Department obtains, organizes, and makes these essential reference materials available to the Department's staff.

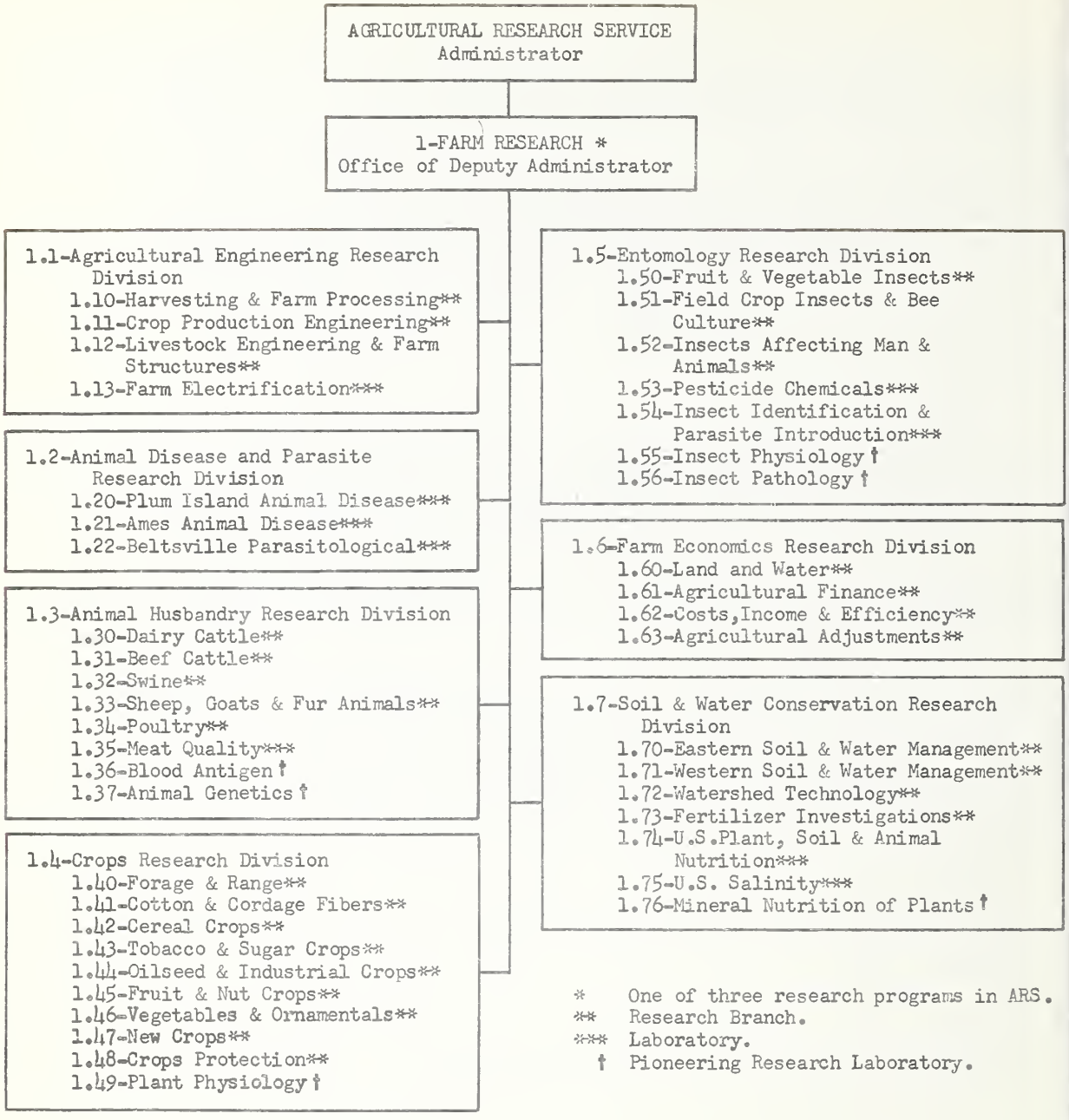
Dissemination of Results of Research

The demand for research information has never been so great as it is today. Farm papers, daily and weekly newspapers, radio, television, and even advertising agencies pass along to the public the results of both State and Federal research work. The Department makes its research results available in scientific journals and in its own publications which include leaflets, circulars, bulletins, agricultural yearbooks, and

numerous periodicals. Typical of the latter group are "Agricultural Research" and "Agricultural Marketing" issued monthly to report late research findings to those who work directly with farmers, processors, marketing agencies, and the general public. In addition to these outlets, research results are quickly filtered into the Department's regulatory and service programs, such as animal disease eradication, plant pest control, meat and poultry inspection, crop and livestock estimates, and grades and standards. The Department's action programs such as those administered by the Agricultural Conservation Program Service, the Soil Conservation Service, the Farmers Home Administration, and the Forest Service are also quick to utilize new findings of research.

Throughout the history of agricultural research there has been a close association with agricultural education. The cooperative Agricultural Extension Service was established in 1914 to give instruction and practical demonstrations to persons other than those attending college. Most of the more than 3,000 counties in the States and territories employ two or more local agents in helping farm and other people with their problems. They extend the results of the research program to those who can use them.

Results of research applicable to agricultural industry are frequently published in trade papers and magazines. Department representatives often attend meetings of industry associations and discuss research results of interest to them. Representatives of industry groups are often invited to research laboratories to see a new method, operation, or product and to discuss the possibilities of commercial adaptation.



* One of three research programs in ARS.
** Research Branch.
*** Laboratory.
† Pioneering Research Laboratory.

1-FARM RESEARCH
See "How to Use this Publication" inside front cover to decipher numbers

1.1-Agricultural Engineering Research Division

1.10-Harvesting and Farm Processing Research Branch - Studies are concerned with:

(a) Mechanical harvesting of cotton including associated practices such as defoliation.
(b) Cotton ginning including development of equipment, methods of controls, means of evaluating quality of ginning, and handling and storage of seed cotton with attention to such problems as gin waste disposal and destruction of insects and other pests in seed cotton.
(c) Methods and equipment for harvesting, handling and processing long fiber plants such as ramie and kenaf.
(d) Harvesting and handling fruits and vegetables.
(e) Harvesting, handling, preparing and storing food and feed grains, small seeds and farm-prepared products thereof, hay and green forages, new and special crops such as castor beans, tobacco and peanuts.
(f) The materials-handling equipment for the above operations.

Locations: Beltsville, Md., 13-9, 15-1, 16-1, 16-5, 17-16, 18-1, 19-1, 19-5, 20-5, 20-8, 21-5, 22-1, 22-6, 27-1, 31-2, 32-1, 41-1, 46-9, 46-15, 47-1, 48-4

1.11-Crop Production Engineering Research Branch - Studies are concerned with:

(a) Interrelationships of soil characteristics to dynamic and kinematic characteristics of tillage, traction and transport equipment.
(b) Effects of design on the performance of tillage, field, transport, and traction equipment, and of design and methods of use on soil physical characteristics.
(c) Suitability of construction materials for various soil-engaging elements of equipment.
(d) Development of methods and equipment for handling crop residues, seedbed preparation, seeding, planting, fertilizer applications, and for controlling weeds, insects and plant diseases through cultural, mechanical, or chemical methods.
(e) Engineering phases of plant environment control under artificial conditions, including temperature, relative humidity, light, air movement and composition.

Locations: Beltsville, Md., 16-1, 18-1, 21-2, 26-2, 31-1, 32-1, 33-1, 47-3

1.12-Livestock Engineering and Farm Structures Research Branch - Studies are concerned with:

(a) Ascertaining and developing, in cooperation with animal scientists, optimum environmental conditions for animal growth, maintenance, and reproduction and the translation of laboratory results into farm-use applications.
(b) Developing structural arrangements and equipment for efficient livestock and materials handling and reducing human labor.
(c) Developing structural designs and selecting or devising materials to meet the requirements for safe storage, preparation and handling of farm products, farm service buildings, and housing.
(d) Developing farmhouse plans, including construction materials specifications, and heating, cooling, water supply, waste disposal and ventilating facilities.
(e) Devising farmstead building arrangements with a view to the reduction of labor cost, and to increase efficiency.

Locations: Beltsville, Md., 6-1, 11-1, 16-1, 16-11, 26-1*, 31-1, 32-1, 33-1, 46-9

1.13-Farm Electrification Research Laboratory - Studies are concerned with:

(a) Electromagnetic radiation, in cooperation with biologists, and its effect on growth and production responses of plants, animals and insects.
(b) Solar energy radiation, with particular attention to determining the magnitude available for given situations, developing and testing of solar energy collectors and storage devices, and useful application.
(c) Development and refinement of electric controls for research and farm application, and electric apparatus for creating and controlling environments for plants and animals.
(d) Farm applications of electricity, particularly the effects on demand, diversity and safety characteristics of power and wiring distribution requirements for farms.
(e) Performance characteristics of electrical equipment.
(f) Developing new instrumentation and devising new combinations for special measurements.

Locations: Beltsville, Md., 7-1*, 13-1, 14-1, 16-1, 21-1, 24-1, 28-1, 29-1, 30-1, 31-1, 32-1, 34-1, 35-1, 42-1, 48-1, 48-7

* Funds but no resident personnel

1.2-Animal Disease and Parasite Research Division

1.20-Plum Island Animal Disease Laboratory - The primary objective is the development of measures and techniques for the prevention, control and eradication of highly communicable exotic animal diseases of potential danger to this country. Fundamental and applied research is conducted in the broad fields of microbiology, chemistry, physiology, immunology, cytology, serology, pathology, and related sciences.

Location: Plum Island, N. Y.

1.21-Ames Animal Disease Laboratory - The primary objective is the development of measures and techniques for the prevention, control and eradication of highly communicable domestic animal diseases. Fundamental and applied research is conducted in the broad fields of bacteriology, mycology, virology, rickettsiology, chemistry, physiology, immunology, serology, physiopathology, toxicology, cytology and related sciences.

Locations: Beltsville, Md., 4-1*, 6-1*, 7-1*, 10-1*, 11-1*, 13-1*, 14-1*, 16-1*, 17-5, 18-1, 19-1*, 21-1*, 21-18, 28-1*, 30-1*, 31-1*, 32-1, 38-1*, 40-1*, 40-5, 43-1, 46-9*, 46-24, 48-1

1.22-Beltsville Parasitological Laboratory - The primary objective is the development of measures and techniques for the prevention, control and eradication of internal and external parasites of animals. Fundamental and applied research is conducted in the broad fields of protozoology, helminthology, cytology, chemistry, parasitology, physiology, and related sciences.

Locations: Beltsville, Md., 14-1*, 16-5, 16-11, 18-1, 19-1, 25-1*, 29-5, 35-1*, 38-1*, 41-1, 41-3, 43-1, 46-9*

* Funds but no resident personnel

1.3-Animal Husbandry Research Division

1.30-Dairy Cattle Research Branch - Scientific investigations are concerned with:

(a) The improvement of strains of dairy cattle through genetic and breeding studies.
(b) Means for judging and selecting dairy cattle through evaluations of anatomical characteristics.
(c) Feeding and nutrition including such considerations as nutritional requirements, value of feeds, feeding regimens, the bacteriology and chemistry of rumen functions, and feeding management factors affecting quantity and quality of milk.
(d) The physiological aspects of growth, reproduction, infertility and lactation.
(e) Nutrient content of milk and the factors affecting these properties.
(f) Means of promoting health of animals and efficiency and economy of production through improved management practices.

Locations: Beltsville, Md., Washington, D.C., 4-1*, 7-1*, 14-8, 16-11*, 20-7, 21-1*, 24-5, 26-1, 27-1*, 28-2*, 28-6*, 29-1, 30-1, 31-1, 38-6, 48-7*

1.31-Beef Cattle Research Branch - Scientific investigations are concerned with:

(a) Developing superior strains and producing improved breeds through breeding and progeny testing.
(b) Animal genetics, including genetic composition and behavior, and development and application of principles and breeding procedures to improve animal strains.
(c) Feeding and nutrition, involving such considerations as nutrient requirements, value of various forages and feed in meeting requirements and effects on end products.
(d) The physiological aspects of reproduction, growth, metabolism, hormone action and environmental responses.
(e) Improvement of management practices for more economical products of meat and other products.

Locations: Beltsville, Md., 13-2, 14-1*, 16-11, 17-9, 20-7, 21-1*, 21-3, 21-6*, 22-5, 24-1, 35-1, 35-2, 38-5, 40-5

* Funds but no resident personnel

1.32-Swine Research Branch - Scientific investigations are concerned with:

(a)
(b)
(c) Same as for Beef Cattle Research, previous page.
(d)
(e)

Locations: Beltsville, Md., 27-1*, 29-1*, 32-1, 38-5

1.33-Sheep, Goats and Fur Animals Research Branch - Scientific investigations are concerned with:

(a)
(b)
(c) Same as for Beef Cattle Research, previous page.
(d)
(e)
(f) Quality of wool, fur and animal fibers, including: physical, chemical and biological processes involved in development and structure; methods of testing and measuring; and effects of processing as it relates to husbandry research.

Locations: Beltsville, Md., 7-1, 8-7*, 16-11*, 19-1*, 21-3*, 24-1*, 30-1*, 41-2, 44-2, 46-9*, 46-24

1.34-Poultry Research Branch - Scientific investigations are concerned with:

(a) Developing superior strains and producing improved breeds through breeding and progeny testing.
(b) Poultry genetics, including genetic composition and behavior, and development and application of principles, theories, and breeding procedures to improve the quality of poultry strains.
(c) Feeding and nutrition, involving such considerations as nutrient requirements, and values of various feeds in meeting requirements.
(d) Physiological functions associated with development and reproduction, and environmental responses.
(e) Improvement of management practices for more economical production of meat and products.
(f) The quality and nutritive value of poultry products as affected by breeding, feeding, management, physiology and related factors.

Locations: Beltsville, Md., 16-1, 27-1, 28-1, 29-1*, 30-1*, 32-1*, 42-3

* Funds but no resident personnel

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1.35-Meat Quality Laboratory - Scientific investigations include:

(a) Assays of nutritive value of meats and meat products, and quality evaluations as influenced by feeding, breeding and management.
(b) Quality studies including criteria and methods for ascertaining effects of various factors on quality of meat and meat products.

Location: Beltsville, Md.

1.36-Blood Antigen Pioneering Laboratory - Objectives include:

(a) Investigation of the basic principles of blood antigens.
(b) Determination and characterization of antigens in the blood of animals.
(c) The possible relation of antigens or antigen groups to describe desirable or undesirable traits.
(d) The development of improved techniques for analysis.
(e) The standardization of reagents used in blood antigen analysis.

Location: Beltsville, Md.

1.37-Animal Genetics Pioneering Laboratory - Basic objectives are to arrive at a progressively clearer knowledge of concepts of inheritance, gene behavior, the occurrence and causative factors for the appearance of mutations, the effects of systems of mating, selection and environmental factors on genetic traits of the animal organism.

Locations: Quantitative genetics - Lafayette, Indiana
Chemical genetics - Beltsville, Md.

1.4-Crops Research Division

1.40-Forage and Range Research Branch - Studies are concerned with:

(a) The development of varieties with higher quality and productivity and increased resistance to diseases, insects and climatic hazards.

(b) Plant genetic composition and behavior, and the development of new and improved breeding methods through the application of accepted genetic facts.

(c) The pathology of crop disease organisms and the development of control measures.

(d) The management, production and physiological behavior of crops, including adaptation to climatic and soil conditions, and the relationship of environmental factors to yields and quality.

(e) The evaluation of the influence of heredity and environmental factors on crop performance.

Locations: Beltsville, Md., 2-1, 7-1, 8-1, 13-1, 14-1, 15-1, 16-5, 16-11, 17-1, 19-1, 19-5, 20-4*, 21-1, 21-4*, 21-21, 22-1, 22-3, 23-3, 25-1, 28-1, 30-1, 31-1, 33-1, 34-1, 35-1, 36-1, 37-4, 38-1, 38-5, 39-1, 40-1, 40-2, 41-1, 42-1, 42-5, 43-1, 43-6, 45-1, 46-1, 46-9, 46-15*, 46-27, 47-1, 47-7, 47-10, 48-1, 48-10

1.41-Cotton and Cordage Fibers Research Branch - Studies are concerned with:

(a)
(b)
(c) Same as for Forage and Range Research Branch.
(d)
(e)

Locations: Beltsville, Md., 9-5*, 14-1, 15-1, 15-3, 16-1, 16-5, 16-11, 17-16, 18-1, 19-1, 19-5, 20-1, 21-1, 21-5, 21-9, 21-12, 22-1, 22-6*, 23-1, 23-5, 24-1, 41-1, 42-5, 46-1, 46-9, 46-15, 46-20, 46-27, 47-1

* Funds but no resident personnel

1.42-Cereal Crops Research Branch - Studies are concerned with:

(a) The development of varieties with higher quality and productivity and increased resistance to diseases, insects and climatic hazards.
(b) Plant genetic composition and behavior, and the development of new and improved breeding methods through the application of accepted genetic facts.
(c) The pathology of crop disease organisms and the development of control measures.
(d) The management, production and physiological behavior of crops, including adaptation to climatic and soil conditions, and the relationship of environmental factors to yields and quality.
(e) The evaluation of the influence of heredity and environmental factors on crop performance.

Locations: Beltsville, Md., 7-1, 8-1, 13-1*, 14-1, 16-5*, 16-11, 17-1, 17-16, 19-1, 19-5, 20-1, 20-6, 21-1, 21-4, 21-8, 21-21, 22-1, 23-6, 24-1, 26-4, 27-1, 28-1, 29-1, 30-1, 31-1, 32-1, 33-1, 34-1, 34-2, 35-1, 36-1, 37-1, 38-1, 42-1, 43-1, 44-4, 46-6, 46-9, 46-18, 47-1, 47-6, 48-1

1.43-Tobacco and Sugar Crops Research Branch - Studies are concerned with:

(a)
(b)
(c) Same as for Cereal Crops Research Branch.
(d)
(e)

Locations: Beltsville, Md., 8-6, 11-5, 13-1*, 13-6*, 14-1, 14-2, 14-6, 15-3, 16-11, 16-13, 17-12, 17-15, 19-6, 20-1*, 20-8, 24-1, 24-2*, 24-3, 25-1, 25-3, 27-1, 30-1, 31-1, 40-1, 41-1*, 43-4, 44-5, 46-14, 46-27

1.44-Oilseed and Industrial Crops Research Branch - Studies are concerned with:

(a)
(b)
(c) Same as for Cereal Crops Research Branch.
(d)
(e)

Locations: Beltsville, Md., 13-1*, 13-9, 14-1, 15-1*, 16-5*, 16-11, 17-1, 17-11*, 18-1, 19-5, 20-1*, 21-1, 21-10*, 22-1, 23-1*, 23-3, 26-1*, 27-1*, 28-1, 29-1, 30-1*, 31-1, 32-1, 33-1, 35-1, 35-3, 36-1, 37-1, 42-6, 42-8, 43-1, 46-9, 46-14, 46-27, 47-1, 48-10*

* Funds but no resident personnel

1.45-Fruit and Nut Crops Research Branch - Studies are concerned with:

(a) The development of varieties with higher quality and productivity and increased resistance to diseases, insects and climatic hazards.
(b) Plant genetic composition and behavior, and the development of new and improved breeding methods through the application of accepted genetic facts.
(c) The pathology of crop disease organisms and the development of control measures.
(d) The management, production and physiological behavior of crops, including adaptation to climatic and soil conditions, and the relationship of environmental factors to yields and quality.
(e) The evaluation of the influence of heredity and environmental factors on crop performance.

Locations: Beltsville, Md., 9-1, 14-1, 14-8*, 15-1, 16-7, 16-12, 16-13, 17-1, 17-10, 19-6, 20-2, 20-5, 21-13, 21-25, 22-1, 22-3, 28-1, 29-6, 30-1, 30-4*, 31-1*, 37-4, 39-3*, 43-1, 46-9, 46-13, 46-25, 46-26, 46-27*, 47-1, 47-4, 47-12, 48-4, 48-10

1.46-Vegetables and Ornamentals Research Branch - Studies are concerned with:

(a)
(b)
(c) Same as for Fruit and Nut Crops Research Branch.
(d)
(e)
(f) Farm windbreaks.
(g) Seed germination and seed physiology.
(h) Biological control of soil-borne plant pathogens.
(i) Effect of chemical residues in the soil on growth and quality of vegetables.

Locations: Beltsville, Md., 1-2, 5-1*, 7-1*, 15-4*, 15-5, 16-5*, 16-11, 17-18, 19-6, 20-1, 21-25*, 22-3, 26-1, 27-1, 30-1, 32-1, 37-1*, 37-4, 39-3, 40-1, 40-3, 42-1, 42-6*, 43-1, 44-4, 44-5, 44-7, 46-9*, 46-14, 46-28, 47-1, 48-2, 48-&*, 48-10

* Funds but no resident personnel

1.47-New Crops Research Branch - Studies are concerned with:

(a) Searching for and importing promising new plants for production, chemical and industrial utilization.
(b) Botanical studies such as the preparation of taxonomic monographs and reference materials on plant distribution and use.
(c) Preliminary evaluation of plant introductions at Federal and cooperative introduction centers, and development of potentially new crops for the U. S.

Locations: Beltsville, Md., 7-5, 11-4, 14-1*, 15-1*, 16-5, 16-9, 17-19, 20-1*, 21-1*, 22-1*, 32-1, 34-1*, 35-1*, 40-1, 46-5, 48-1

1.48-Crop Protection Research Branch - Studies are concerned with:

(a) Taxonomy, biology, and ecology of weed species and nematodes.
(b) Development of control methods, such as chemical measures and management practices.
(c) Evaluations of chemical control measures, and resulting crop and residual problems.
(d) Mycological investigations.
(e) Epidemiological research on the nature and occurrence of plant diseases, and forecasting of epidemics.
(f) Preparation and dissemination of plant disease information.
(g) Evaluation of antibiotics and related compounds for plant disease controls.
(h) Growth-regulating compounds, including the plant physiological reactions and screening tests to determine effectiveness on specific plants.

Locations: Beltsville, Md., 7-1, 7-9, 9-1, 10-1, 14-1, 14-9, 16-5, 16-11, 17-8, 17-10, 17-18, 18-1, 19-1, 19-5, 20-1, 20-4, 21-1, 21-25, 22-1, 22-3, 23-4, 23-6, 24-6, 27-1, 28-1, 30-1, 31-1, 32-1, 33-1, 34-2, 35-1, 38-1, 38-6, 39-1, 40-1*, 40-5, 42-1, 42-2, 42-5, 43-1, 43-4, 44-5, 45-1, 46-9, 46-14, 46-15, 47-1, 47-7, 47-10, 48-1, 48-7, 48-10

1.49-Plant Physiology Pioneering Research Laboratory - The basic objective is to arrive at a progressively clearer understanding of the ways in which plants are influenced by their environment. Work is involved with problems such as flowering and fruiting, dormancy of buds, bulbs, seeds, spores or other organs, growth of trees and herbaceous plants and other related matters in which light plays a key role.

Location: Beltsville, Md.

* Funds but no resident personnel

1.5-Entomology Research Division

1.50-Fruit and Vegetable Insects Research Branch - Studies are concerned with:

(a) The biology, ecology, and prevalence of insects affecting horticultural crops.
(b) The development, improvement, and use of chemical control practices, mechanical and biological control measures, and in cooperation with plant scientists, development of insect-resistant plant varieties.
(c) The role of insects as vectors of disease affecting the production of horticultural crops.
(d) The development, improvement, and use of measures for the treatment of insect problems associated with the processing of horticultural crops or their handling in trade channels.

Locations: Beltsville, Md., 1-1, 7-1*, 7-5, 7-7*, 7-10, 9-2, 9-6, 12-2, 14-2, 15-3, 15-5, 16-7, 16-12, 17-3*, 17-4, 17-10, 17-13, 20-2, 26-3, 26-4*, 28-5, 30-1*, 40-1, 42-4, 43-1, 44-5, 46-21, 46-25, 47-1, 47-3, 48-4, 48-5, 48-8 48-9, 48-11

1.51-Field Crops Insects and Bee Culture Research Branch - Studies are concerned with:

(a) The development, improvement, and use of chemical control practices, mechanical and biological control measures, and in cooperation with plant scientists, the development of insect-resistant plant varieties.
(b) The role of insects as vectors of diseases affecting the production of field crops.
(c) The breeding of superior strains of honeybees, control and eradication of their diseases and parasites, the development and improvement of management methods, and the development and improvement of methods of utilizing honeybees and other native insects as pollinators.

Locations: Beltsville, Md., 8-1, 15-3, 16-11, 17-16, 18-6, 19-1, 19-5, 20-1, 20-3, 20-8, 21-1, 21-8, 21-14, 21-25*, 21-26, 22-1, 23-1*, 26-4, 28-1, 30-1, 32-1*, 32-2, 33-1, 34-1, 35-1, 37-1*, 37-3, 38-1, 39-1, 42-1, 42-5*, 42-6, 42-7, 43-1, 46-16, 47-3

* Funds but no resident personnel

1.52-Insects Affecting Man and Animals Research Branch - Studies are concerned with:

(a) The biology, ecology and prevalence of insects affecting man and animals.

(b) The development, improvement and use of chemical and biological control measures as well as other control devices and problems.

(c) The role of insects as vectors of diseases affecting man and animals.

Locations: Beltsville, Md., 17-10, 19-5, 21-18, 35-1, 45-1, 47-1

1.53-Pesticide Chemicals Research Laboratories - Studies are concerned with:

(a) The development of new or the improvement of formulations of synthetic organic chemicals or plant products for use as insecticides, repellents, attractants, and synergists.

(b) The development and improvement of chemical and biological methods for the quantitative evaluation of chemical residues in food, feed, animal products and soils and for the disinfestation of aircraft transporting insect pests of agricultural or public health importance.

(c) The evaluation by laboratory investigations of new compounds and formulations and the performance of biological tests of insecticide formulations in the development of purchase specifications.

Locations: Beltsville, Md., 9-6, 16-11, 17-10, 21-18, 21-26, 28-5, 31-1*, 46-21, 48-8

1.54-Insect Identification and Parasite Introduction Laboratories - Studies are concerned with:

(a) The development of insect classifications through studies on their morphology, biology, and distribution.

(b) The conduct of literature research in connection with the development of insects and mites classifications.

(c) The exploration, importation, investigation, recommendation, and distribution of parasitic, predatory and phytophagous insects for use as biological control over insect pests and noxious plants.

Locations: Beltsville, Md., Washington, D.C., 9-6, 14-1*, 42-1*, 46-10, 46-25

* Funds but no resident personnel

1.55-Insect Physiology Pioneering Research Laboratory - The primary goal of this laboratory is to obtain information on the normal physiological and biochemical processes of insects. Research includes physiological and biochemical studies on insect growth, development, sensory perception, reproduction, and the utilization and fate of essential metabolites. Comparative studies with insects and mammals concerning the intoxication and detoxication systems involved in insecticide and synergist mode of action and investigations on the biochemical and physiological basis of insect resistance to insecticides are also conducted.

Location: Beltsville, Md.

1.56-Insect Pathology Pioneering Research Laboratory - This laboratory is concerned with investigation of the fundamental nature of the complex of pathogenic microorganisms and insects that make up the insect disease pattern. Fundamental studies are made of entomogenous microorganisms and the environmental conditions under which they are capable of causing epizootics in insect populations. Scientists are determining the type of pathogens involved, the conditions under which pathogenic organisms of various kinds are responsible for epizootics in insect populations, and how they might be cultured for possible practical application.

Location: Beltsville, Md.

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1.6-Farm Economics Research Division

1.60-Land and Water Research Branch - Studies are concerned with:

(a) The economic utilization of land and water resources including use inventories, trends, current changes, development, conservation and resource potentials.
(b) Competing major and special uses of land and water resources including the effect of urban and industrial expansion.
(c) Cost-benefit analyses of resource development.
(d) Tenure, including the land tenure situation, farm tenancy problems, land ownership, leasing arrangements and rates.
(e) The organization and operation of resource districts and associations.
(f) The legal-economic aspects of land and water utilization, property rights and transfers.
(g) Land and water use regulations including zoning.
(h) The relationship of resource utilization and tenure to income and values.
(i) The economic aspects of resource development and management proposals of Federal agencies related to river basin and watershed development programs.

Locations: Washington, D.C., 14-1, 22-1, 25-1, 29-1, 30-1, 32-1, 32-3, 35-1, 40-1, 46-1

1.61-Agricultural Finance Research Branch - Studies are concerned with:

(a) Trends and current changes in the terms, use and availability of long and short term farm credit including farm financial management practices, the economics of capital formation, and the composition of farm financial assets.
(b) Farm real estate values and market activities including appraisal techniques, trends in type and volume of farm real estate sales, farm rental estimates, and current and prospective value levels.
(c) Agricultural risks and insurance including the measurement of risk elements in farming, operations of farmers' mutual insurance companies, and use, cost, and availability of life and liability insurance for farmers.
(d) Social security measures as they affect farm and financial management.
(e) Federal, State and local tax measures as they affect individual farmers and agriculture as a whole.
(f) Organization and financing of local government in rural and rural-urban fringe areas including the development of more equitable methods of financing governmental expenditures in rural areas adjacent to urban and industrial developments.

Locations: Washington, D.C., 15-1, 27-1, 32-1

1.62-Costs, Income and Efficiency Research Branch - Studies are concerned with:

(a) The utilization, productivity, requirements for and supply of farm labor.
(b) Trends, costs and efficient use of farm machines, structures, and electrification.
(c) Farm production processes to determine new and more efficient applications of farm technology including emerging developments.
(d) Cost and productivity of particular farm practices including use of fertilizers and agricultural chemicals, application of soil management practices, and crop rotations.
(e) Farm related aspects of the production and utilization of off-farm inputs.
(f) Livestock-feed relationships including relation of requirements to supply, application of principles of diminishing returns, and grain-forage substitutions in livestock feeding.
(g) Trends and current changes in investments, resources used, expenses and incomes on important types and sizes of farms in major type-of-farming areas.
(h) Analyses of changing production costs and periodic appraisals of the cost situation on farms and in agriculture.

Locations: Washington, D.C., 7-1*, 19-5, 27-1*, 29-1, 40-1, 43-1

1.63-Agricultural Adjustments Research Branch- Studies are concerned with:

(a) Current and future agricultural production needs and prospects for supplying these needs including measurement of trends and current changes in farm output, input, and productivity.
(b) Need for, profitability of, and obstacles to agricultural adjustments which affect income and production on farms and in areas and the Nation as the result of technological, economic and other changes.
(c) The related effects on agricultural adjustments of conservation needs, changes in production practices, resource combinations and improvements, and organization and operation of farms and farm enterprises.
(d) Effectiveness of current and alternative programs in achieving needed adjustments.
(e) Production responses of the various segments of agriculture to changes in prices, costs, and other significant influences.
(f) Effects of size of farm and associated resource requirements on levels of income and production.
(g) Characteristics and location of low-production farms and low-income agricultural areas and opportunities for income improvement and related adjustments.

Locations: 2-1, 7-1, 8-1, 9-1, 13-1, 14-1, 15-1, 16-1, 17-1, 18-1, 19-1, 19-5, 20-1, 21-1, 22-1, 23-1, 24-1, 25-1, 26-1, 27-1, 28-1, 29-1, 30-1, 31-1, 32-1, 33-1, 34-1, 35-1, 36-1, 37-1, 38-1, 39-1, 40-1, 41-1, 42-1, 43-1, 44-1, 45-1, 46-1, 46-9, 47-1, 48-1, Washington, D.C.

* Funds but no resident personnel

1.7-Soil and Water Conservation Research Division

1.70-Eastern Soil and Water Management Research Branch - Studies are concerned with:

(a) Methods for predicting and measures for controlling runoff and soil losses.
(b) Soil tilth and tillage practices which will improve soil structure, sustain productivity, and contribute to improved control of runoff and erosion.
(c) Soil-plant-water relationships influencing irrigation and drainage requirements and development of improved on-the-farm irrigation and drainage system designs.
(d) The evaluation of fertilizers and development of soil fertility and liming practices for conservation farming.
(e) Integration of soil and water management practices for efficient systems of conservation farming.
(f) Fundamental research to develop principles, theories, and improved methods and techniques in the field of soil-plant-water relationship problems.

Locations: Beltsville, Md., 1-1, 2-1, 3-1, 7-1, 8-1, 9-1, 13-1, 13-8, 14-1, 15-1, 16-2, 16-3, 16-10, 16-11, 17-18, 18-1, 18-4, 19-1, 19-2, 20-1, 23-1, 26-1, 26-4*, 28-1, 29-1, 30-6, 31-4, 32-1, 33-1

1.71-Western Soil and Water Management Research Branch - Studies are concerned with:

(a) Methods for predicting and measures for controlling wind and water erosion and surface runoff.
(b) Soil tilth and tillage practices which will improve soil structure, sustain productivity, and contribute to control of runoff and erosion.
(c) Methods for conserving precipitation and soil moisture in dryland areas.
(d) Supply, conveyance, control and conservation of irrigation water supplies.
(e) Soil-plant-water-climate relationships influencing irrigation and drainage requirements.
(f) Development of improved on-farm irrigation and drainage system designs.
(g) Role of microorganisms in soil and water management.
(h) Reclamation and management of saline and alkali soils.
(i) Development of practices for improvement of soil fertility and evaluation of fertilizer performance on soils for crops.
(j) Integration of management practices for efficient and sustained systems of conservation farming.

* Funds but no resident personnel

1.71-Western Soil and Water Management Research Branch (Cont'd.)

(k) Fundamental research to develop principles, theories, and improved methods and techniques in the field of soil-plant-water relationship problems for farm crop and range lands.

Locations: Beltsville, Md., 21-1*, 21-2, 21-11, 21-17, 21-25, 22-1, 22-2, 22-3, 22-4*, 22-6, 34-1, 34-2, 34-3, 35-1, 35-3, 35-4, 36-1, 36-2, 37-4, 38-1, 38-2, 38-3, 38-6, 39-1, 39-2, 40-1, 40-4, 40-6, 41-1, 41-4*, 42-1, 42-4, 42-5, 42-7, 43-1, 44-3, 44-6, 45-1, 46-1, 46-9, 46-13, 46-17, 46-20, 46-22, 46-25, 46-27, 47-1, 47-5*, 47-6, 47-8, 48-1, 48-10

1.72-Watershed Technology Research Branch - Studies are concerned with:

(a) Measuring and evaluating the effects of land use patterns, and combinations of practices and treatments of agricultural watersheds on water yields, amount, rate and distribution of runoff, groundwater accretion and movement, sedimentation, and stream channel regimen.

(b) The fundamental processes in the hydrologic cycle, including rain and snow, evaporation, transpiration, infiltration, surface runoff, and groundwater recharge in agricultural watersheds.

(c) The processes of sediment production, transportation and disposition.

(d) Procedures for relating stream flow, groundwater, sedimentation, and stream channel regimen to climatic and watershed characteristics.

(e) Hydraulic and physical properties of natural and artificial channels.

(f) Hydraulic, hydrologic and sedimentation criteria for engineering design of watershed and channel protective and improvement works.

(g) Development and testing of improved hydraulic, hydrologic and sedimentation designs of upstream reservoirs, spillways, channel protective measures, gradient control structures, group drains and distribution systems, floodways, and other measures for water use, control and conveyance in connection with protection, development and flood prevention on agricultural watersheds.

Locations: Beltsville, Md., 3-2, 4-5*, 7-6, 11-1, 12-1, 13-1, 17-18, 19-3, 21-15, 22-1, 26-5, 27-1*, 30-1, 31-1, 35-1, 35-5, 36-2, 41-1, 41-3*, 42-1, 44-1, 46-18*

* Funds but no resident personnel

1.73-Fertilizer Investigations Research Branch - Studies are concerned with:

(a) Chemical and physical characteristics of fertilizers, liming materials and soil amendments.
(b) Development of production processes.
(c) Preparation of new fertilizer materials and mixtures in sufficient quantity for field experiments by other branches of the Division and cooperating State experiment stations.
(d) Develops methods of analysis and standards for fertilizers and liming materials in cooperation with Association of Official Agricultural Chemists, Association of American Fertilizer Control Officials, and other organizations.
(e) Gathers, analyzes, and publishes statistics on resources, supplies, production, consumption, and trade relations of all types of fertilizers and liming materials in cooperation with other government agencies and the fertilizer industry.

Location: Beltsville, Md.

1.74-U. S. Plant Soil and Animal Nutrition Laboratory - Studies are concerned with:

(a) Mineral nutrient supply in soils and crops as related to the uptake of nutrients and elaboration of compounds within the plant.
(b) Effect of soil, climatic and management factors on the nutritive value of plants, including the elaboration of vitamins and other organic nutrients of special nutritive value to animals.
(c) Determination of basic requirements of animals for nutritional properties having their origin in soil or geologic sources.
(d) Function of mineral nutrient elements in plants and animals.
(e) Development of techniques for study of mineral deficiencies, toxicities and unbalances in plants and animals.

Locations: 2-1*, 7-1

* Funds but no resident personnel

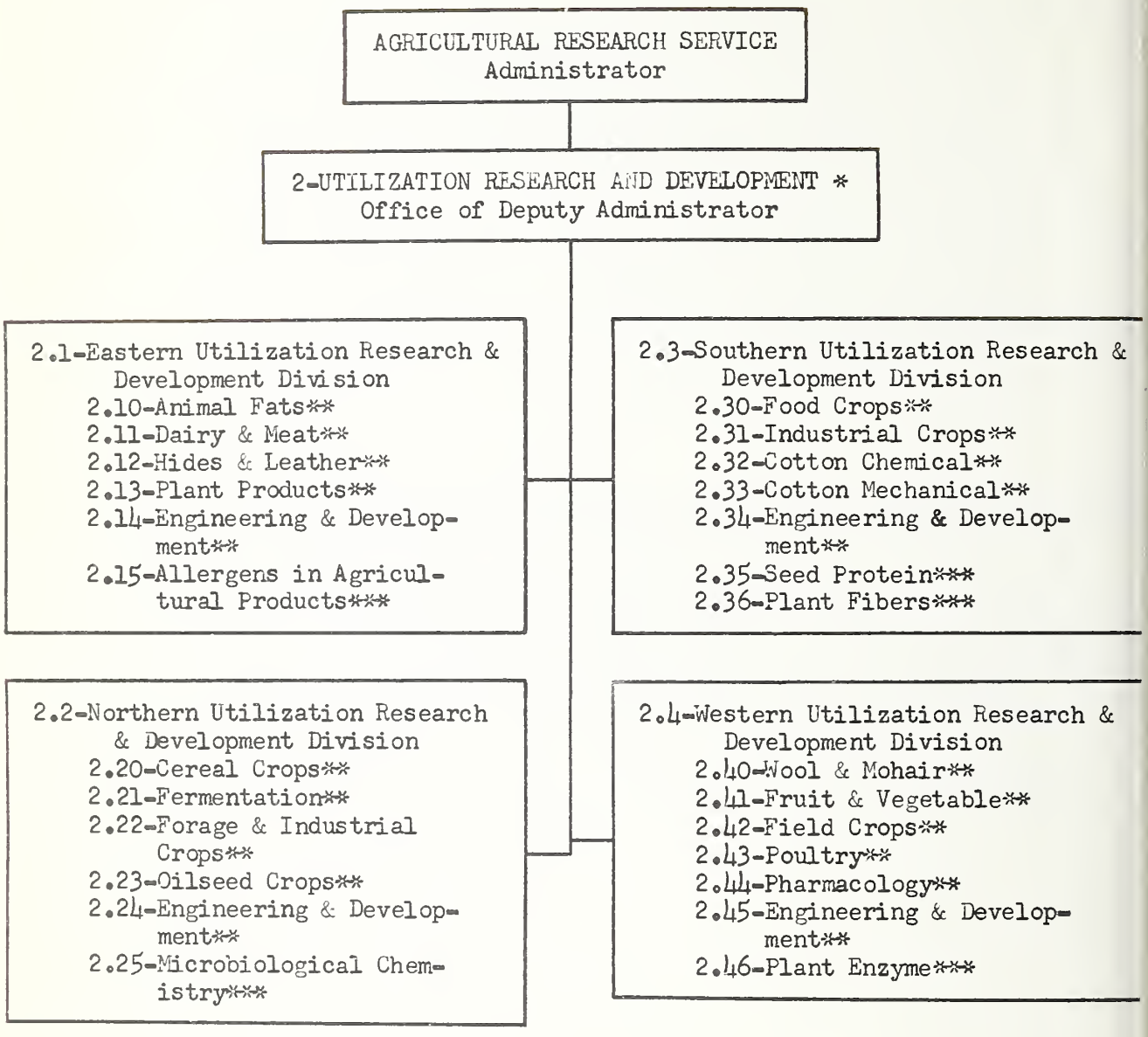
1.75-U. S. Salinity Laboratory - Studies are concerned with:

(a) Mechanisms of chemical reactions associated with the formation and reclamation of saline and alkali soils.
(b) Physical processes involved in intake, retention and movement of water in soils and use of water by plants.
(c) Relation between water composition and chemical characteristics of soil.
(d) Physiological nature of tolerance of plants to salt and excess sodium.
(e) Effects of specific ions from salt-affected soils on the physiological processes of plants.
(f) Fundamental principles affecting control of water tables in salt-affected soils.

Location: Riverside, California

1.76-Mineral Nutrition of Plants - Pioneering Research Laboratory - The general objective is to work in the direction of developing a better understanding of processes related to the mineral nutrition of plants. The central theme of the research is to learn more about how plants accumulate inorganic ions and how these ions function in plants. Research efforts will be most concentrated in the fields of biochemistry, plant physiology and soil science, although the laboratory is not restricted to these fields if scientific discoveries lead the work into other areas.

Location: Beltsville, Md.



* One of three research programs in ARS
** Laboratory
*** Pioneering Research Laboratory

2-UTILIZATION RESEARCH AND DEVELOPMENT
See "How to Use this Publication" inside
front cover to decipher numbers

2.1-Eastern Utilization Research and Development Division

2.10-Animal Fats Laboratory - Studies are concerned with:

(a) The improvement of the quality of edible animal fats and the extension of their usage through the development of new shortenings and food fat products.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The extension of the uses of inedible animal fats and wool grease by preparation of derived products having increased utilization potential.
(d) The evaluation of these derivatives for industrial end uses.

Locations: 8-1*, 8-5, 46-11*

2.11-Dairy and Meat Laboratory - Studies are concerned with:

(a) The composition and properties of milk and the changes produced by processing.
(b) The prevention of deteriorative changes in milk and milk products during processing and storage.
(c) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(d) The development of improved evaporated and dried milk, nonsterile concentrated and frozen concentrated milks, and products derived from milk, primarily cheese, nonfat milk solids, and butter.
(e) The development of new and extended uses for cheese whey.
(f) The basic composition of meat.
(g) The development of improved methods of handling and processing fresh and preserved meats.
(h) The development of new or improved meat products.

Locations: Beltsville, Md., Washington, D.C1, 22-1*, 26-4*, 28-3*, 29-1*, 29-2*, 31-1*, 32-1*

* Funds but no resident personnel

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2.12-Hides and Leather Laboratory - Studies are concerned with:

(a) The composition and properties of animal hides and skins and related products.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The interaction between animal hides and various organic reagents.
(d) The chemistry of changes in properties produced by modification of animal hides.
(e) The development of new and improved processes for curing, preserving, unhairing, tanning and converting animal hides.
(f) The development of new and improved products derived from animal hides and skins and related products.

Locations: 8-5, 9-5*, 26-7*

2.13-Plant Products Laboratory - Studies are concerned with:

(a) The increased utilization of selected fruits and vegetables grown in the East, honey, maple sirup, and tobacco through the development of knowledge as to the relation of composition to the quality of fresh, stored, and processed products.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The development of new and improved products and processes.
(d) The utilization and disposal of byproducts.
(e) The chemical screening and evaluation of selected plant species as sources of precursors for the production of cortisone, its analogues, various sex hormones, and other special plant constituents.
(f) The development in the laboratory of economically practical processes for the production of desired products.
(g) The isolation, synthesis, or modification of new biologically active compounds from plants or plant materials for use as or in agricultural chemicals.

Locations: 7-1*, 7-5*, 7-8*, 8-5, 9-1*, 11-1*, 14-1*, 27-1*, 30-1*, 42-1*

* Funds but no resident personnel

2.14-Engineering and Development Laboratory - Provides leadership and direction over the conduct of engineering and development research required for the processing and production of products developed by the Eastern Utilization Research and Development Division.

Locations: Wyndmoor, Pa., College Park, Md.*

2.15-Allergens in Agricultural Products - Pioneering Research Laboratory - This laboratory engages in fundamental studies on the chemistry and immunology of allergens in agricultural products. These studies are concerned with the isolation and identification of the chemical and physiological properties of allergens of food and industrial products derived from farm products, as well as establishing the basic mechanism by which these materials produce the allergic response in man. They will contribute to the little-known science, immunochemistry, and thus to the general health, and the principles established will be useful in the processing of agricultural products so that the allergy thereto can be minimized.

Location: Washington, D.C.

* Funds but no resident personnel

2.2-Northern Utilization Research and Development Division

2.20-Cereal Crops Laboratory - Studies are concerned with:

(a) The chemical and physical characteristics of cereal grains, their components and products as a means for providing the basis for the development of new or improved processes and products.

(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.

(c) The development of new or improved products from:

1. Cereal starches and starch-derived components.
2. Proteins, peptides, and constituent amino acids of cereal grains.
3. Cereal grain and cereal grain flours.
4. Grain processing byproducts.

Locations: 9-4*, 26-1*, 29-4, 30-5*, 31-1*, 32-1*, 35-1*

2.21-Fermentation Laboratory - Studies are concerned with:

(a) The identification and characterization of chemical products formed by bacteria, molds, and yeast.

(b) The mechanisms and reactions by which microorganisms form identifiable chemical products.

(c) The development and improvement of physical, microbiological, and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.

(d) The exploration and development of microorganisms for the production of products beneficial to plant and animal agriculture, and for industrial usage.

(e) The maintenance and development of a collection of representative types of bacteria, molds, yeasts, and actinomycetes of agricultural and industrial importance.

Locations: Urbana, Illinois*, Peoria, Illinois, Columbia, Mo.*

* Funds but no resident personnel

2.22-Forage and Industrial Crops Laboratory - Studies are concerned with:

(a) Qualitative and quantitative chemical analyses of new plant materials, including forages, to ascertain their potential as new and replacement crops.
(b) The isolation, purification, and characterization of constituents of new plants.
(c) Chemical evaluation of new plants or plant components as to nutritional quality or suitability for modification by biochemical processes.
(d) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(e) The prognostication of potential competitive value of new plants, and the development of recommendations for further development from the chemical utilization viewpoint.
(f) The development of new and improved industrial processes and products from agricultural crop residues, such as straw, cobs, hulls and bagasse stalks.

Locations:New York City, New York*, Peoria, Illinois

2.23-Oilseed Crops Laboratory - Studies are concerned with:

(a) The chemical and physical characteristics of oilseeds, their components and products as a means for providing the basis for the development of new or improved processes and products.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The development of new or improved products from:
    1. Linseed, safflower, and soybean oils and their fatty acids.
    2. Soybean and other oilseed meals and derived proteins.

Locations: 21-19*, 26-1*, 29-1*, 29-4, 31-1*

* Funds but no resident personnel

2.24-Engineering and Development Laboratory - Provides leadership and direction over the conduct of engineering and development research required for the processing and production of products developed by the Northern Utilization Research and Development Division.

Locations: Newark, New Jersey*, Peoria, Illinois, Manhattan, Kansas*

2.25-Microbiological Chemistry-Pioneering Research Laboratory - In general, research is aimed at developing basic information on the behavior of microorganisms and more specifically at the discovery of fundamental principles underlying metabolic processes. Because of their great importance to the understanding of metabolic processes, it is proposed to determine the chemical pathways by which microorganisms convert a substrate into a particular product. With a thorough knowledge of these processes, we will be in a better position to control them for the benefit of agriculture and medicine.

Location: Peoria, Illinois

* Funds but no resident personnel

2.3-Southern Utilization Research and Development Division

2.30-Food Crops Laboratory - Studies are concerned with:

(a) The composition of selected Southern-grown food crops and their products.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The compositional changes brought about through processing operations as a means of improving the quality of processed products.
(d) The development of new and improved products and uses of commercial value.
(e) The development of new products and uses from byproducts and wastes.

Locations: 14-1, 17-14, 19-3*, 20-8, 20-9, 21-25, 29-1*

2.31-Industrial Crops Laboratory - Studies are concerned with:

(a) The composition, properties, and characteristics of Southern-grown oilseeds and their derivatives.
(b) The composition of pine gum and gum rosin.
(c) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(d) The development of new or improved oil and meal products, and processes for their production.
(e) The development of new industrial chemicals from pine gum and gum rosin, and processes for their production.

Locations: 17-7, 19-3*, 20-5, 20-9, 21-1*, 24-1*, 29-1*, 42-1*, 46-20*

2.32-Cotton Chemical Laboratory - Studies are concerned with:

(a) The partial modification of cotton cellulose by reaction with chemicals to impart desirable qualities.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The application of resins and other chemical compounds to cotton to improve quality.
(d) The development of new and improved chemical processing techniques and treatments of cotton fibers, yarns, and fabrics.

Locations: 11-3*, 14-1*, 15-1*, 20-9, 21-8*, 26-1*

* Funds but no resident personnel

2.33-Cotton Mechanical Laboratory - Studies are concerned with:

(a) The relationship of the physical properties of cotton fibers and yarns to the qualities of fabrics.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The development of improved mechanical processing techniques.
(d) The design and development of new types of cotton products for specific end uses.

Locations: Dedham, Massachusetts*, Atlanta, Georgia*, New Orleans, Louisiana

2.34-Engineering and Development Laboratory - Provides leadership and direction over the conduct of engineering and development research required for the processing and production of products developed through chemistry utilization research by the Southern Utilization Research and Development Division.

Location: New Orleans, Louisiana

2.35-Seed Protein - Pioneering Research Laboratory - General objectives are to obtain information leading to better characterization of plant proteins. Purification of individual proteins will furnish materials which can be studied further to determine the amino acid sequence and other structural factors of plant proteins, as is being done for certain selected animal proteins. Ultimately, it is hoped that the information so obtained will permit comparison of the fundamental structure of seed proteins with other plant proteins and with animal proteins.

Location: New Orleans, Louisiana

2.36-Plant Fibers - Pioneering Research Laboratory - The essential theme of the research is to obtain basic information on the supermolecular structure of plant fibers and its multiform relationship to fiber mechanical behavior. Basic information not now available on plant textile fibers, particularly cotton, is obtained with the intent to relate polymer and fiber structure to the properties of fibers. It is the purpose of the research to obtain the information needed for a better understanding of textilephenomena and for the interpretation of the effects of mechanical and chemical treatments and modifications.

Location: New Orleans, Louisiana

* Funds but no resident personnel

2.4-Western Utilization Research and Development Division

2.40-Wool and Mohair Laboratory - Studies are concerned with:

(a) The chemical and physical properties of natural and modified wool and mohair fibers.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The development of new or improved mechanical and chemical treatments.
(d) The discovery and development of modifications of wool and mohair for new and improved products.

Locations: Dedham, Massachusetts*, Laramie, Wyoming*, Albany, California

2.41-Fruit and Vegetable Laboratory - Studies are concerned with:

(a) The chemical and physical properties of plant parts, products derived therefrom, and their components.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The microbiological and other factors involved in processing fruit and vegetable products.
(d) The development of new and improved products from:
    1. Fruits, including citrus, apples, and tree nuts.
    2. Vegetables, including potatoes, dry beans, and peas.
    3. Their byproducts and processing wastes.

Locations: 43-5*, 44-1*, 46-1*, 46-10, 46-18, 48-1*, 48-7, 48-10

2.42-Field Crops Laboratory - Studies are concerned with:

(a) The chemical and physical properties of plant parts, products derived therefrom, and their components.
(b) The development and improvement of physical and chemical methods and instrumentation for determining composition, chemical structure, and physical properties.
(c) The determination of optimum processing methods.
(d) The development of new and improved products utilizing:
    1. Forage grasses and legumes
    2. Cereal grains
    3. Sugar beets
    4. Their byproducts and processing wastes

Locations: 29-2*, 30-1*, 46-10, 47-1*

* Funds but no resident personnel

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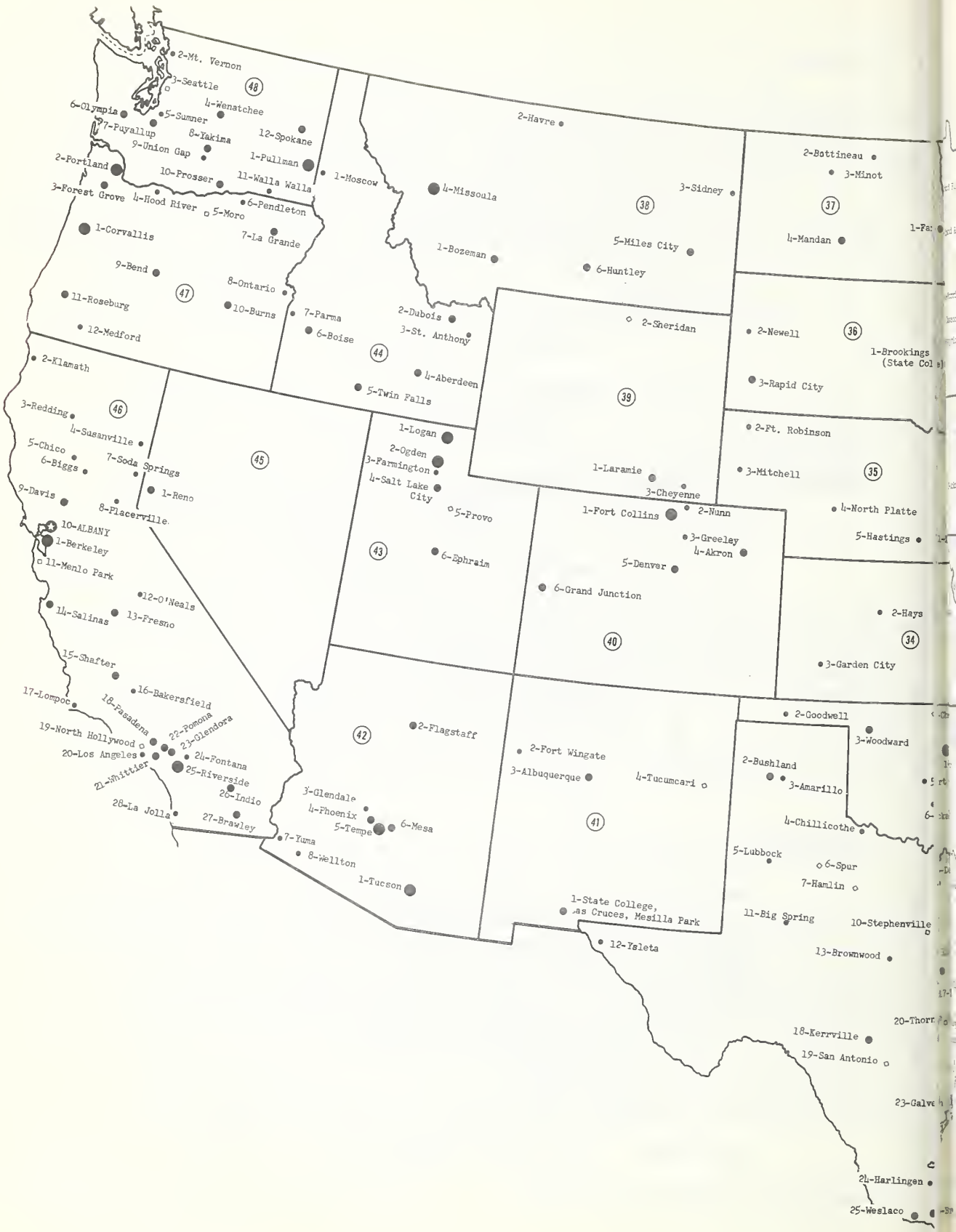
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as Cruces, Mesilla Park
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19-San Antonio
20-Thorn
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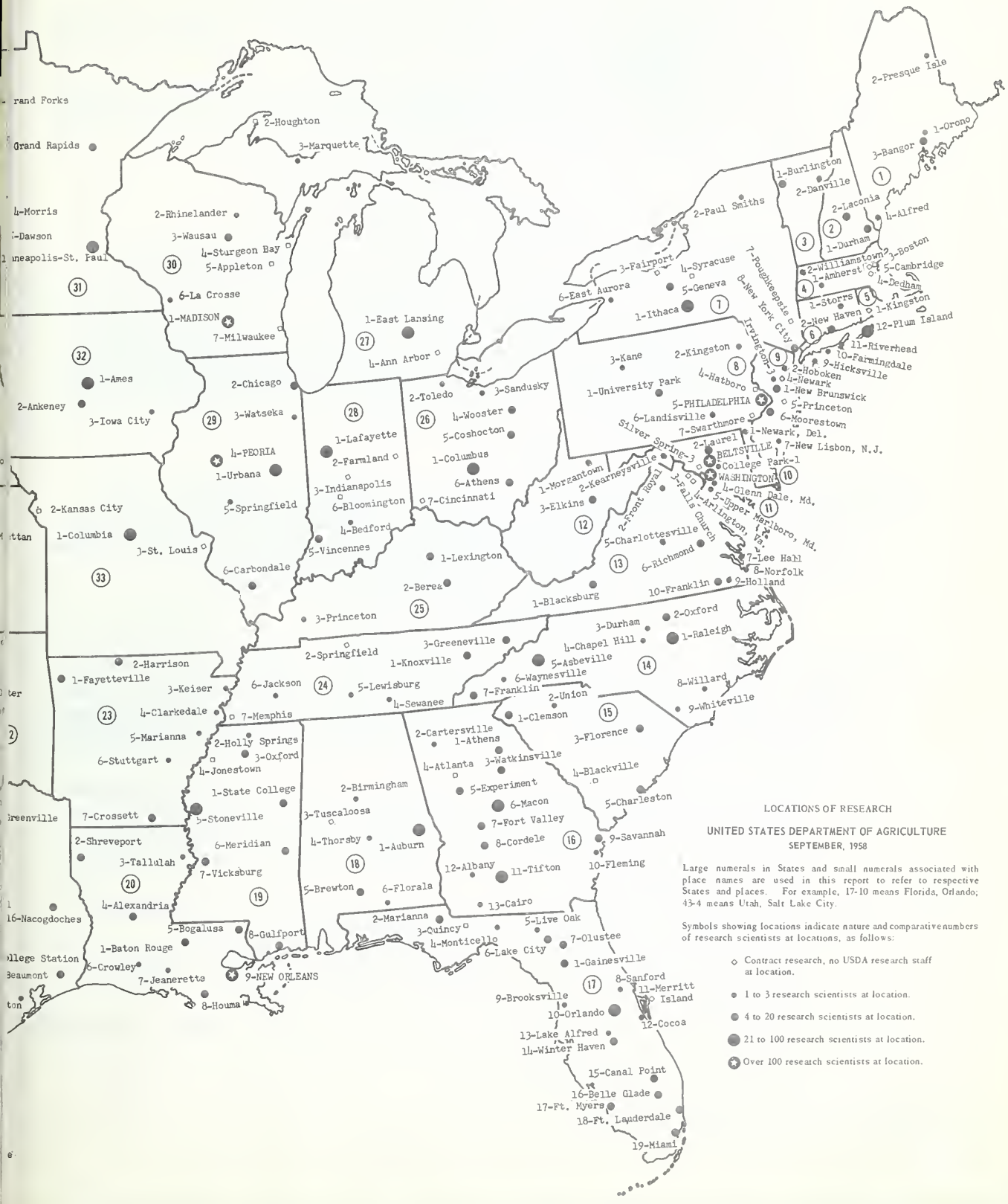
25-Weslaco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13-Cairo
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4-Monticello
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8-Sanford
9-Brooksville
10-Orlando
13-Lake Alfred
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1-Raleigh
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3-Florence
4-Blackville
5-Charleston
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1-New Brunswick
5-Princeton
6-Moorestown
1-Newark, Del.
7-New Lisbon, N.J.
2-Paul Smiths
3-Fairport
4-Syracuse
5-Geneva
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8-New York City
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1-University Park
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5-PHILADELPHIA
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7-Swarthmore
2-Laurel
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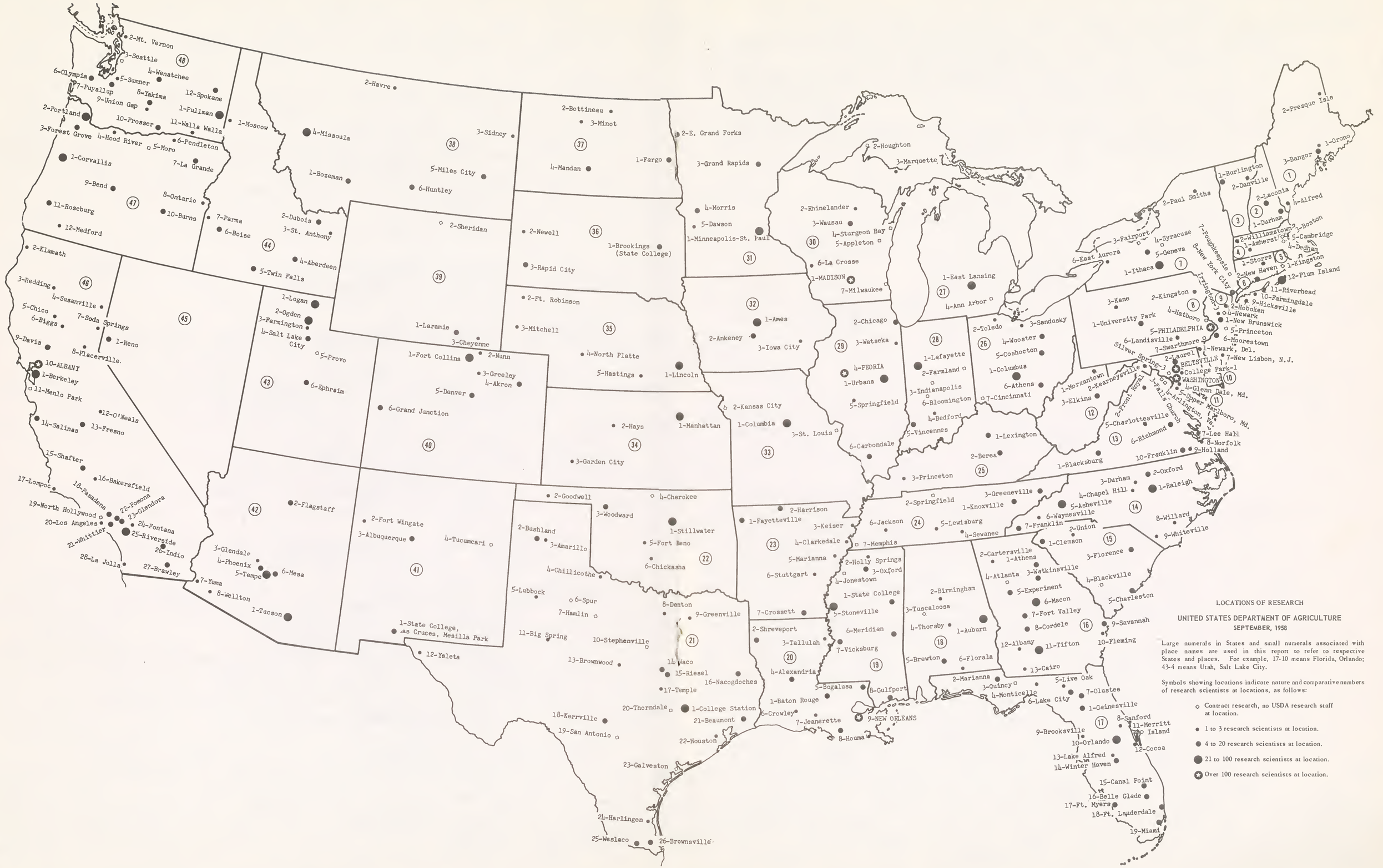
4-Glenn Dale, Md.
5-Upper Marlboro, Md.
7-Lee Hall
8-Norfolk
9-Holland
10-Franklin
1-Morgantown
2-Kearneysville
3-Elkins
2-Front Royal
3-Falls Church
4-Arlington, Va.
5-Charlottesville
6-Richmond
1-Blacksburg
Silver Spring-3
LOCATIONS OF RESEARCH
UNITED STATES DEPARTMENT OF AGRICULTURE
SEPTEMBER, 1958
Large numerals in States and small numerals associated with place names are used in this report to refer to respective States and places. For example, 17-10 means Florida, Orlando; 43-4 means Utah, Salt Lake City.
Symbols showing locations indicate nature and comparative numbers of research scientists at locations, as follows:
◇ Contract research, no USDA research staff at location.
● 1 to 3 research scientists at location.
● 4 to 20 research scientists at location.
● 21 to 100 research scientists at location.
Over 100 research scientists at location.



LOCATIONS OF RESEARCH

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- ✪ Over 100 research scientists at location.

3-INSTITUTE OF HOME ECONOMICS
See "How to Use this Publication" inside front cover to decipher numbers

3.1-Clothing and Housing Research Division

3.10-Textiles and Clothing Laboratory - Studies are concerned with:

(a) The properties of fabrics of known composition, construction, and finish in relation to specific clothing and household uses.
(b) The evaluations of the nature and degree of deterioration of fabrics during wear, storage or reconditioning.
(c) The effects of detergents and other agents used in laundering, disinfecting and otherwise caring for clothing and house furnishings.
(d) The development of home procedures for fabric care.
(e) The development of principles and information basic to the improvement of the sizing and design of clothing, to afford safety, comfort, improved fit and other satisfactions to the wearer.
(f) Development of improved or labor-saving home sewing techniques and procedures using modern materials and household facilities.

Location: Beltsville, Md.

3.11-Housing and Equipment Laboratory - Studies are concerned with:

(a) Space requirements for work and leisure time activities in the home.
(b) Space arrangement and use, including equipment placement in relation to physiological energy expenditures, efficiency, family needs and preferences.
(c) The development of designs for activity areas, built-in facilities and house plans that incorporate results of functional housing research.
(d) Suitability of various types of interior finishes for specific uses, ease of care and upkeep, durability, appearance and cost.
(e) Performance requirements for different types of household equipment to meet household needs.
(f) The development of procedures and conditions of use and care that contribute to efficient utilization of equipment.

Location: Beltsville, Md.

3.2-Household Economics Research Division

3.20-Food Economics Research Branch - Studies are concerned with:

(a) Present-day patterns of food consumption, including quantities used and expenditures made for specific kinds of food.
(b) Present-day practices in the acquisition and use of food.
(c) The nutritive content of food supplies of households, of individuals, and of the national per capita food supply.
(d) The relative efficiency of various food management practices, involving different allocations of money, time and skill in family situations.
(e) Family food budgets developed from research on the nutritive value and relative economy of foods, human requirements for nutrients, use of food in family meals, food supplies, and family purchasing power.

Location: Washington, D.C.

3.21-Diet Appraisal Research Branch - Studies are concerned with:

(a) The nutritional adequacy of diets of individuals and of households, sometimes involving cooperative studies of the nutritional state of people.
(b) The compilation and evaluation of data from the world's scientific literature and the preparation of comprehensive reference tables on the nutritive value of individual foods in their various forms in terms of proximate composition, protein and amino acids, fat and fatty acids, minerals and vitamins.
(c) The compilation, evaluation, and interpretation of research findings on foods and nutrition needed for the preparation of source materials for consumer education programs.

Locations: Washington, D.C., 31-1, 31-5, 46-20*

* Funds but no resident personnel

3.22-Family Economics Research Branch - Studies are concerned with:

(a) Present day patterns of consumption of rural families, including quantities used, expenditures made for, and inventories of specific items (except food).

(b) Present-day practices in the acquisition and use of items of family living.

(c) The appraisal of levels of living achieved by various income, age, occupational and regional groups.

(d) The relative efficiency of various home management practices involving different allocations of money, time and skill in family situations.

(e) Guides for family spending developed from research on present-day patterns of consumption and practices in the acquisition and use of items of family living and on the relative efficiency of various home management practices.

(f) The review, evaluation and interpretation of data on the economic aspects of family living necessary for periodic reports on the situation and outlook.

Locations: Washington, D.C., East Lansing, Michigan*

* Funds but no resident personnel

3.3-Human Nutrition Research Division

3.30-Food Composition Laboratory - Studies are concerned with:

(a) The development, adaptation, and improvement of physical, chemical, and microbiological methods for quantitative determination of nutrients.
(b) Establishing the validity of such methods for specific purposes, and standardizing procedures for large-scale use in food assays.
(c) Devising and validating means for appropriate sampling of commodities.
(d) Multiple nutrient analyses for better understanding of nutrient relations and variations in foods.
(e) The chemical nature and relative importance of constituents of foods affecting nutritional value and stability of nutrients.
(f) Systematic assays of common present-day foods, as marketed and as eaten, to determine the content of nutrient and non-nutrient substances affecting nutritive value.

Location: Beltsville, Md.

3.31-Food Quality Laboratory - Studies are concerned with:

(a) The development, adaptation, and improvement of physical, chemical, histological, bacteriological, sensory, and preparational methods for evaluation of quality.
(b) The quality characteristics and factors affecting cooking properties of selected foods and the yields of edible foods for specific uses.
(c) The effect of experimental procedures (such as use of agricultural chemicals) in production, processing, and marketing on cooking quality and palatability of foods.
(d) The development of principles and procedures for food preparation and improved use of equipment to conserve food quality.
(e) Factors affecting quality of food during household processing, storage, and preservation.
(f) The development of principles and improved procedures for home freezing, canning, and other modes of food preservation to maintain safety and maximum table quality.

Locations: Beltsville, Md., Ames, Iowa*, Davis, California*

* Funds but no resident personnel

3.32-Experimental Nutrition Laboratory - Studies are concerned with:

(a) The development, adaptation, and improvement of biochemical, physiological, and other criteria of biological response to diet and their correlations and interpretations.

(b) The development and selection, through breeding of standardized animals and animals genetically sensitive to nutritional imbalances, as needed for specific purposes.

(c) The measurement of metabolic responses through balance experiments and correlations with analyses of body fluids and tissues.

(d) The response of animals throughout life or successive generations to different food combinations, levels and ratios of nutrients as measured by appropriate criteria, including growth, reproduction, longevity, and body composition.

(e) The interactions of nutrients, tolerance limits for dietary components and other relationships among food constituents affecting the functions of nutrients.

(f) The discovery of nutritional failures through autopsies, histological examinations, chemical, enzymic, and other analyses of organs and tissues.

(g) The ranges of levels and ratios in nutrient intakes compatible with normal growth, metabolic function, and nutritional well-being.

Location: Beltsville, Md.

3.33-Human Metabolism Laboratory - Studies are concerned with:

(a) The energy expenditure of persons under conditions of basal metabolism and during various physical activities and nutritional states.

(b) Appraisal of nutritional state in relation to self-chosen food and nutrient intake in different environmental situations.

(c) The development of statistical correlations between diet and various indexes of nutrition.

(d) The evaluation of available data and the preparation of reference tables on requirements for nutrients and on physical, biochemical and other criteria used in nutritional appraisal.

(e) The metabolic patterns of persons of different ages and nutritional states.

(f) The digestibility of foods under various conditions, the availability of nutrients from foods to body tissues, and the effects of other food constituents and food processing on physiological availability.

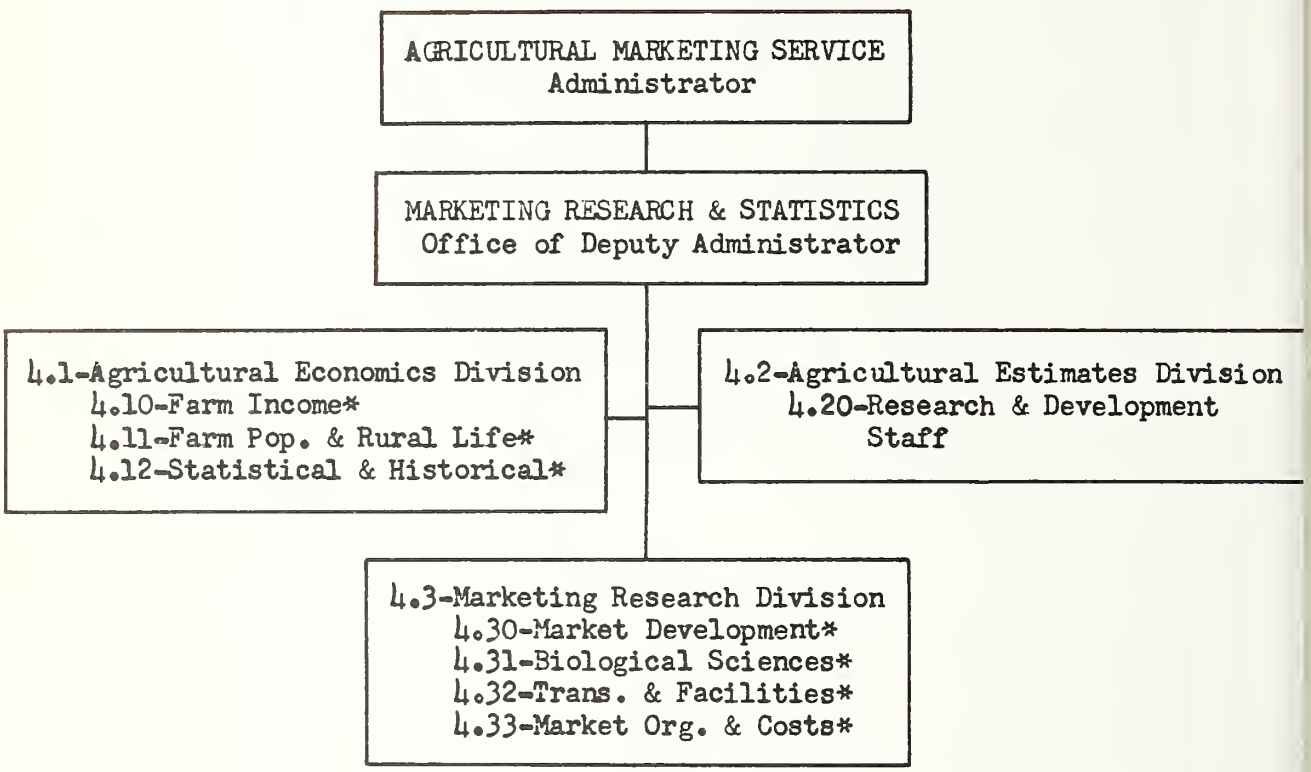
(g) The determination of human requirements by biochemical and other analyses of the effects of graded intake levels of nutrients and foods, and the quantities required by persons of different ages in different environmental and nutritional states.

Locations: Beltsville, Md., 18-3*, 20-9*, 21-23*, 22-1*
23-1*, 30-1*, 31-1*, 46-20*, 48-1*

* Funds but no resident personnel

3.34-Cellular Metabolism Pioneering Laboratory - The general objective is to develop new insight into problems relative to the function, requirements and interrelationships of nutrients that are important to the nutrition of man and to apply this knowledge to the advancement of human nutrition research. The research is directed toward the development of new basic information on cellular nutrition, physiology and biochemistry, using microorganisms (bacteria, protozoa, algae, yeasts and molds) as experimental tools.

Location: Beltsville, Md.


AGRICULTURAL MARKETING SERVICE
Administrator
MARKETING RESEARCH & STATISTICS
Office of Deputy Administrator
4.1-Agricultural Economics Division
4.10-Farm Income*
4.11-Farm Pop. & Rural Life*
4.12-Statistical & Historical*
4.2-Agricultural Estimates Division
4.20-Research & Development
Staff
4.3-Marketing Research Division
4.30-Market Development*
4.31-Biological Sciences*
4.32-Trans. & Facilities*
4.33-Market Org. & Costs*

* Branch

4-MARKETING RESEARCH AND STATISTICS

See "How to Use this Publication" inside front cover to decipher numbers

4.1-Agricultural Economics Division

4.10-Farm Income Branch - Studies are concerned with:

(a) Preparing calendar year estimates of income and expenditures, aggregates, averages and distributions, by type and source, for the United States and by States, of farm operators and their families, and other persons living on farms.

(b) Preparing monthly estimates of cash receipts from farm marketings by States and by commodities, and other statistical estimates involved in determining gross and net farm income position of farm people.

(c) Conducting statistical and economic analyses of:

1. The relationships between farm production, marketings, and farm income; farm income and expenditures; and farm and non-farm incomes.
2. Factors affecting farm income and expenditures and shifts in their distribution.
3. The size distribution of farm and non-farm incomes.
4. Current and long-time trends in the income of farm operators and farm laborers and factors affecting the welfare of people on farms.

(d) Analyzing general economic conditions affecting agriculture, and agricultural-industrial relations in the broadest sense, including analysis of forces tending to cause economic instability, and the problem of effecting a satisfactory balance between agriculture and industry; analyzes factors affecting the over-all levels of farm prices, farm income and demand for farm products.

(e) Analyzing changes in the general price level and their effects on the levels of prices and incomes received by farmers.

Locations: Washington, D.C., East Lansing, Michigan*

* Funds but no resident personnel

4.11-Farm Population and Rural Life Branch - Studies are concerned with:

(a) Conducting research and analyses of changes and trends in population, migration, vital statistics, and related factors.
(b) Collecting survey data and preparing periodic official estimates and other reports for publication.
(c) Conducting research and analyses of size, composition, distribution and changes in the farm working force, of the structure of agricultural wages and wage rates, and of the earnings, employment, tenure and occupational conditions of farm workers, and of their comparative conditions among areas, regions and countries.
(d) Collecting special survey data and preparing periodic official estimates and other reports for publication.
(e) Conducting research and analyses of existing levels of living by geographic areas and functional and status groups, and of factors associated with differences in levels of living among areas, groups, and countries, and between farm and non-farm people, and analysis of the various components of level of living, such as health and housing.
(f) Preparing periodic level of living indexes, situation reports, and other reports for publication.
(g) Coordinating and conducting research assigned to the Branch relating to the rural development program.
(h) Identifying and describing rural areas of low income and low levels of living.
(i) Consulting and collaborating with other agencies of the Department of Agriculture and State Agricultural Experiment Stations on projects relating to the rural development program.
(j) Summarizing work being done in the pilot counties.
(k) Preparing progress reports on the various aspects of the research and action programs undertaken.

Locations: Washington, D.C., 7-1*, 8-1*, 14-1, 14-4, 20-1*, 22-1*, 25-1, 26-4*, 27-1*, 31-1*, 32-1, 40-5*, 43-1*, 43-5*

4.12-Statistical and Historical Research Branch - Studies are concerned with:

(a) Developing methods of measuring consumption or disappearance of foods and other farm products.
(b) Determining consumption by income groups, geographical areas, institutions and industries.
(c) Statistical and economic analyses of factors affecting food consumption.
(d) Developing estimates of consumption, aggregate and per capita, of farm products in the U. S. and their utilization between domestic and foreign users, including changes in commercial and government stocks.

* Funds but no resident personnel

4.12-Statistical and Historical Research Branch (Cont'd.)

(e) Developing techniques of statistical measurement applicable to substantive research problems.

(f) Analyzing problems involving the measurement of economic relationships in terms of their statistical implications.

(g) Applying statistical techniques to the measurement of economic time series in agriculture.

(h) Developing techniques of computation for handling problems encountered in the Branch's research program.

(i) Analyzing historical material, syntheses of existing studies, and compilation of source materials pertaining to all phases of agriculture.

(j) Documenting mobilization activities and major organizational changes of the Department, particularly during emergencies.

(k) Conducting statistical and economic analyses of supply, demand, price, and income relationships for agricultural commodities and products thereof.

(l) Studying the long-time trends and other influences affecting the economic position of specific commodities.

(m) Improving the basic series used in making the foregoing measurements and studies.

(n) Estimating supply, disposition and related items for the several commodities beyond the farm level on the basis of agricultural estimates and other data.

(o) Preparing forecasts of demand, price, supply, marketings, consumption, and trade for these commodities.

(p) Conducting commodity research projects to provide bases for the outlook and service work in the several commodity fields.

(q) Making detailed analyses of the demand and supply structure of individual commodities, requiring use of advanced research techniques.

(r) Analyzing pricing and trade problems, including problems of:

1. International price structures, exchange rates, tariffs, quotas, and subsidies as they affect exports and imports of agricultural commodities.
2. Geographical price structures and pricing policies affecting the domestic trade and consumption of farm products.
3. Pricing over time, including the basic economics of storage policy and inventory management.
4. Developmental research on economic problems affecting agriculture.

Location: Washington, D.C.

4.2-Agricultural Estimates Division

4.20-Research and Development Staff:

(a) Directs and coordinates, in consultation with the Statistical Standards Division, AMS, the research program of the Division for the development of new or improved statistical estimating methods and techniques.

(b) Conducts research studies in collaboration with the operating Branches and field offices for the testing and evaluation of statistical techniques.

(c) Exercises technical direction over studies carried out in co-operation with the statistical research laboratories of Iowa State College at Ames, Iowa, University of North Carolina at Raleigh, North Carolina, and other institutions as occasion may develop.

(d) Gives advice and assistance to the Branches and field offices in the development, adoption, and use of new or improved statistical techniques.

Locations: Washington, D.C., Raleigh, North Carolina, Ames, Iowa

4.3-Marketing Research Division

4.30-Market Development Branch - Studies are concerned with:

(a) Conducting research to determine:
   1. Market potentials.
   2. Economic aspects of expanded outlets for new or established agricultural products.
   3. Economic feasibility of waste disposal through by-product utilization.
   4. Development and application of new techniques to the solution of current problems relating to product development.

(b) Conducting research, requiring advance survey techniques, relating to consumers at all levels with respect to their preferences, habits, product acceptance, buying and use motivations, levels of information and other factors affecting consumption.

(c) The development and application of new techniques to the solution of current problems relating to or affecting consumption.

(d) Conducting research to find ways and develop plans for expanding domestic markets for agricultural products by public or private programs such as school lunch programs, direct distribution programs, sales at reduced prices, and stamp plans.

(e) The development and application of new techniques to the solution of current problems relating to distribution programs.

(f) Conducting research to determine methods, procedures, and practices to improve the merchandising of agricultural products, including:
   1. Appraisal of the effects of price and inventory management.
   2. Measurement and evaluation of product movement and effects of promotional campaigns.
   3. Evaluation of individual market requirements and of various methods of consumer packaging, labeling, and display.
   4. The development and application of new techniques to the solution of current problems relating to merchandising.

Locations: Washington, D.C., 7-8*, 8-5, 9-5*, 20-9, 29-2*, 29-4, 46-10

* Funds but no resident personnel

4.31-Biological Sciences Branch - Studies are concerned with:

(a) Maintaining and improving the quality of raw and fresh agricultural products during marketing. The investigations may start at harvest and they extend through the grading and packing houses, storage, transportation, and the wholesale and retail markets. The research involves studies of the nature and causes of deterioration, physiological changes that occur during ripening and spoilage. The basic information obtained is used to develop practical treatments and methods of handling to reduce spoilage and to market products of improved quality and appearance.

(b) Development of techniques, methods and devices for objective evaluation and measurement of quality factors in agricultural commodities. This research aids in establishing better grade standards and maturity indices for the raw and processed product, and provides instrumentation and methods needed for quality maintenance and control programs of action agencies.

(c) Development of methods for preventing insect attack on agricultural products while in the marketing channels, thus involving the solution of problems during storage of raw agricultural products and fibers, their processing or manufacture, warehousing and retailing of the finished commodities, and each step of transportation associated with the above. The research is also directed toward preventing the contamination of processed foods by living or dead insects or by insecticidal residues resulting from insect control measures.

Locations: Beltsville, Md., Washington, D. C., 1-2, 5-1*, 7-8, 8-4*, 9-1*, 13-3*, 13-6, 13-7, 14-1, 16-1, 16-9, 16-11, 17-10, 17-19, 19-5, 20-1*, 21-1, 21-22, 21-24, 22-1*, 26-4*, 27-1, 29-2, 29-3, 30-1, 31-2, 32-1*, 34-1, 42-1*, 46-1*, 46-13, 46-19*, 46-22, 47-1*, 48-4

* Funds but no resident personnel

4.32-Transportation and Facilities Branch - Studies are concerned with:

(a) Conducting research on transportation for all types of agricultural commodities including but not restricted to studies and investigations of transportation facilities, methods, equipment, costs, rates, practices, operations and studies of transportation legislation, policies, and regulations.

(b) The development and testing of improved containers and packaging materials.

(c) Conducting research relating to methods, equipment, materials and layout of warehouses and stores to improve trade relationships, functional coordination and operating practices of units engaged in distribution.

(d) Conducting research to determine the principles that should be followed in ascertaining proper size, type, layout, location and method of financing and operating storage, processing and other marketing facilities at assembly, concentration, and terminal points.

(e) Determining, developing and testing improved equipment and methods for preparing products for market and handling them in each kind of facilities.

(f) Conducting the research required, developing plans for, and promoting the construction of proper kinds of marketing and storage facilities for all kinds of farm and food products at specific localities at various stages in the marketing channel.

(g) Determining the type, size, location, design, cost and method of financing and operation best suited for the specific locations.

(h) Determining the financial soundness of the proposed facilities.

Locations: Washington, D.C., 2-1*, 7-3*, 7-11, 8-5, 9-3, 16-1, 17-1, 21-1, 27-1, 28-1, 29-2*, 29-3, 30-7*, 31-1, 31-2, 34-1, 46-11*, 46-13, 48-4, 48-8

* Funds but no resident personnel

4.33-Market Organization and Costs Branch - Studies are concerned with:

(a) Conducting research on the efficiency and costs of marketing, and market outlets for specific agricultural products to determine ways of increasing efficiency and reducing costs, increasing returns to growers, and providing consumers with the choices they desire, involving:
   1. Detailed breakdowns of market costs and margins in the various stages and specified channels of handling, processing and transporting.
   2. Comparative efficiency and costs of the various agencies, methods, organizations, and facilities in rendering services involved at each important stage in taking products from farms and delivering them to ultimate consumers.
   3. Influences of such factors as grades and standards, market news, Federal and State regulations and programs, and educational programs on efficiency and costs of marketing and on market outlets.

(b) Analyzes and evaluates the inter-firm industrial and institutional relations as they affect price-making and costs, profits, and efficiency in marketing specified commodities.

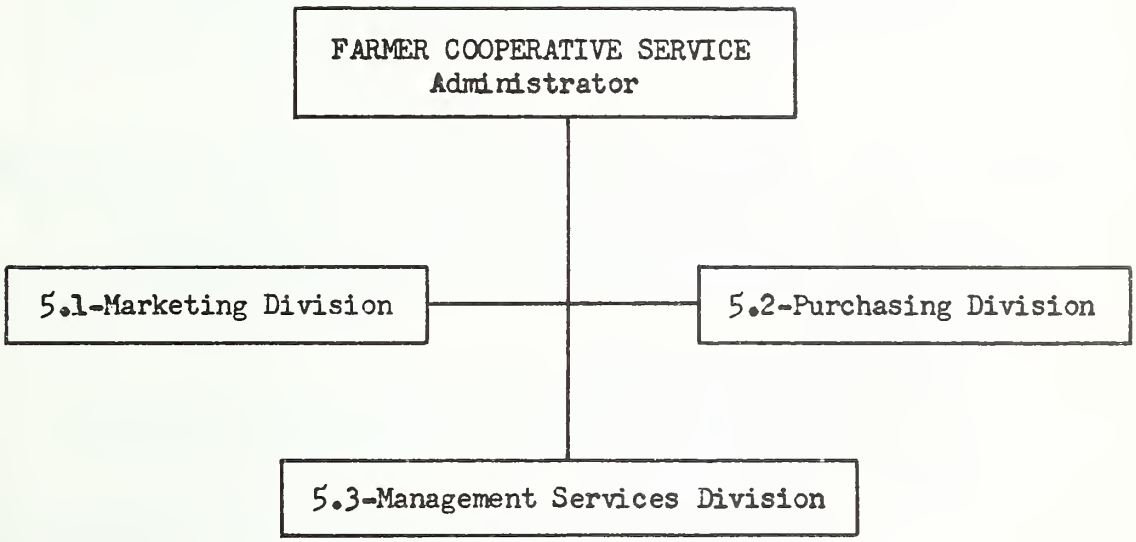
(c) Conducting research on an individual and cross-commodity basis to determine the relationships of marketing channels, structure and practices to:
   1. The efficiency with which marketing functions are performed.
   2. The adequacy of marketing services.
   3. Prices and the price-making process including analyses of:
      -Price and marketing policies of buyers and sellers and factors affecting these policies, including decisions by management.
      -The economic consequences of such specialized marketing institutions as futures trading.
      -The economic impact of agricultural production, marketing and price programs on efficiency, the demand for marketing services, and industries related to agriculture.
      -The effect of Federal, State, and local laws, regulations and taxation on marketing structure and practices.
      -The extent to which economic changes in technology and the pattern of living affect the demand for services and products.
      -Operations and adequacy of special organizations and activities such as market news, grades and standards.

(d) Conducting research and developing economic information relating to the marketing of farm products for the purpose of appraising the agricultural marketing situation and outlook both generally and for particular segments or commodities.

(e) Measuring and analyzing the over-all factors affecting marketing efficiency.

Locations: Washington, D.C., 2-1, 4-1, 4-3*, 6-1, 6-2, 7-1, 7-8*, 9-1, 12-1, 13-1, 13-4*, 14-1, 16-1, 17-1, 19-5, 20-1*, 21-1, 24-1, 24-7*, 26-1, 27-1*, 28-1, 29-1, 30-1, 31-1, 33-2*, 33-3*, 34-1*, 35-1*, 36-1* 38-1*, 40-5, 41-1, 42-1, 46-1, 46-20, 47-1

* Funds but no resident personnel


FARMER COOPERATIVE SERVICE
Administrator
5.1-Marketing Division
5.2-Purchasing Division
5.3-Management Services Division

5-FARMER COOPERATIVE SERVICE

See "How to Use this Publication" inside front cover to decipher numbers

Research in the Marketing Division, the Purchasing Division, and the Management Services Division of the Farmer Cooperative Service is directed toward assisting farmers to set up and operate sound and effective cooperative associations for marketing of their commodities and obtaining farm supplies and services essential to farming operations. Studies relate to such general areas as problems of organization, management, policies, financing, merchandising, product quality, transportation, costs, operating efficiency, and membership. Whenever practicable, studies are carried on in cooperation with land-grant colleges, other governmental agencies, and with cooperative associations.

5.1-Marketing Division - Studies are designed to help farmers achieve operating efficiency and increased bargaining power through their cooperative marketing associations. Research is performed in such areas as:

(a) Organization and structure of marketing cooperatives.
(b) Management controls and practices for maximum operating efficiency.
(c) Pricing plans and methods.
(d) Marketing policies, methods and costs.
(e) Improving processing and storage facilities and techniques.
(f) Improving distribution methods and facilities.
(g) Comparative cost studies.

Locations: Washington, D.C., 14-1*, 19-4*, 21-7*, 21-20*

5.2-Purchasing Division - Studies are directed toward helping farmers to obtain quality farm supplies and services at cost through effective cooperative associations. Studies deal with such areas of research as:

(a) Organization, structure, operation and services of farm supply and farm service cooperatives.
(b) Status and trends in the development of farm supply and service cooperatives.
(c) Policies and practices in distributing farm supplies.
(d) Interregional cooperation among farm supply associations.
(e) Problems and practices in operations of farm business service cooperatives.
(f) Effectiveness of rural credit unions and other credit agencies.
(g) Operating efficiency and effectiveness of frozen food locker cooperatives.

Location: Washington, D. C.

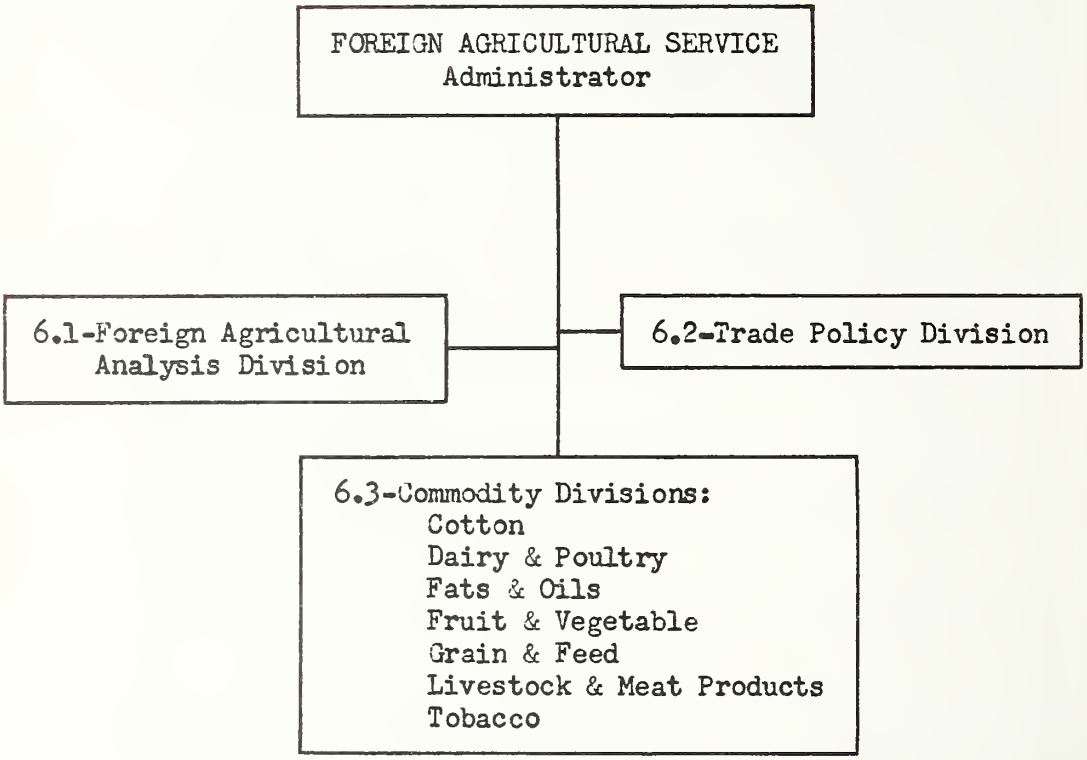
* Funds but no resident personnel

5.3-Management Services Division - Studies are directed toward analysis of problems of functional character common to cooperatives in the marketing, farm supply and farm service fields. Studies deal with such areas as:

(a) Business administration problems of a functional nature, i.e., management training, employee incentive payment plans, financial structures and policies, etc.
(b) Improving the methods of selection and the performance of directors of farmer cooperatives.
(c) Organization and operation of membership educational programs.
(d) Communication processes in farmer cooperatives.
(e) Transportation problems of farmer cooperatives.
(f) History, statistics and trends in the development of farmer cooperatives.

Locations: Washington, D. C., University Park, Pa.*

* Funds but no resident personnel


FOREIGN AGRICULTURAL SERVICE
Administrator
6.1-Foreign Agricultural Analysis Division
6.2-Trade Policy Division
6.3-Commodity Divisions:
Cotton
Dairy & Poultry
Fats & Oils
Fruit & Vegetable
Grain & Feed
Livestock & Meat Products
Tobacco

6-FOREIGN AGRICULTURAL SERVICE
(Only Divisions doing some Research are shown)

6.1-Foreign Agricultural Analysis Division - Research studies are concerned with:

(a) World analyses - agricultural production, consumption and trade.
(b) World analyses - indexes of agricultural production.
(c) World analyses - food balances and other agricultural product utilization.
(d) World analyses - long-range projections of supply and demand for agricultural products.
(e) Country analyses - foreign competition with U. S. agricultural products.
(f) Country analyses - foreign restrictions on the importation of U. S. agricultural products.
(g) Country analyses - for other governmental agencies - agricultural resources, production, consumption, marketing facilities, and trade.

Note: Limited amounts of research are done in connection with service work on the world agricultural situation and world agricultural policies; U. S. foreign trade and complementary crops.

Location: Washington, D.C.

6.2-Trade Policy Division - Research studies are concerned with:

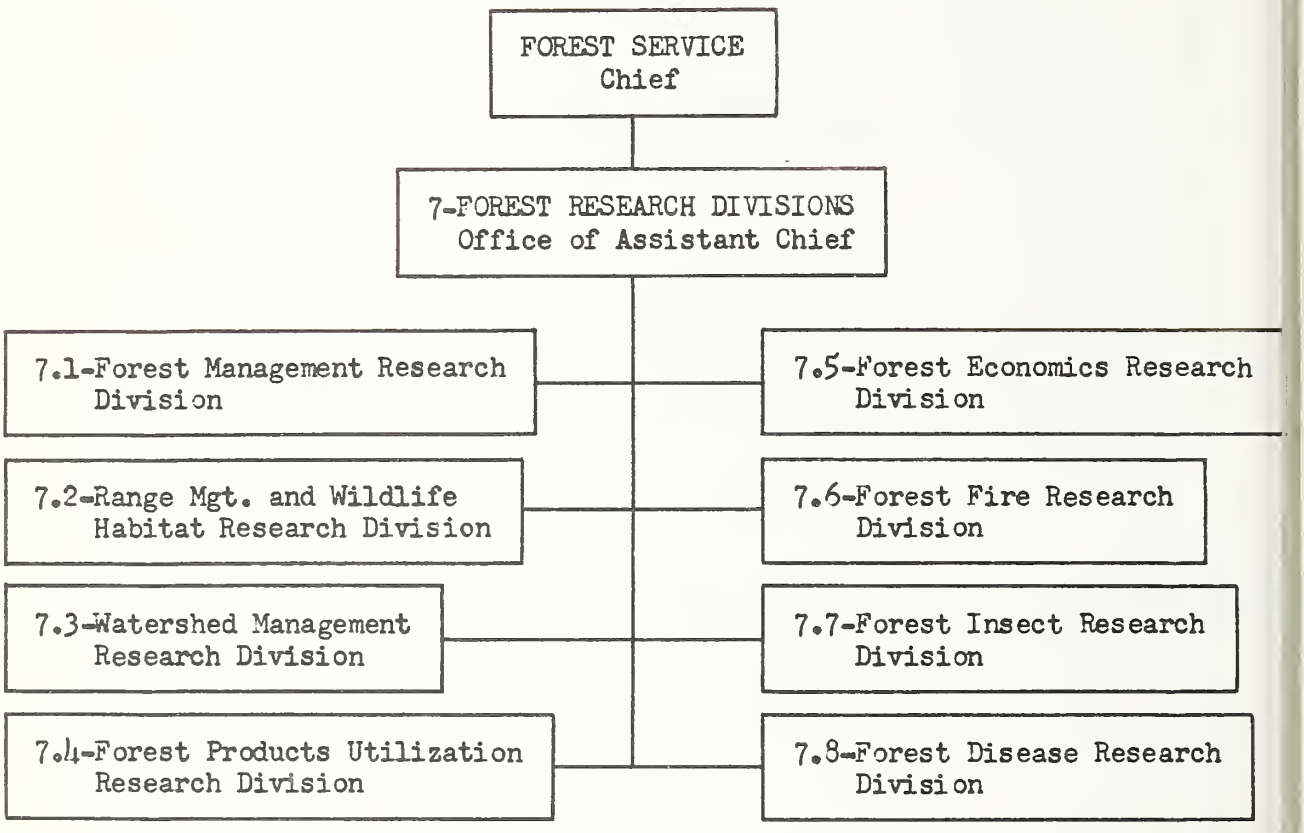
(a) World analyses - foreign monetary and fiscal developments in relation to demand for U. S. agricultural products.
(b) World analyses - foreign trade practices which restrict the demand for U. S. farm products.

Location: Washington, D. C.

6.3-Commodity Divisions - Research studies are concerned with:

(a) Commodity analyses - foreign competition with U. S. agricultural products.
(b) Commodity analyses - situation and outlook reports for foreign countries and the world.

Location: Washington, D. C.


FOREST SERVICE
Chief
7-FOREST RESEARCH DIVISIONS
Office of Assistant Chief
7.1-Forest Management Research Division
7.2-Range Mgt. and Wildlife Habitat Research Division
7.3-Watershed Management Research Division
7.4-Forest Products Utilization Research Division
7.5-Forest Economics Research Division
7.6-Forest Fire Research Division
7.7-Forest Insect Research Division
7.8-Forest Disease Research Division

7-FOREST SERVICE
See "How to Use this Publication" inside
front cover to decipher numbers

7.1-Division of Forest Management Research - Studies are concerned with:

(a) Growing, tending and harvesting of forests.
(b) Life processes of trees and their relationship to environment.
(c) Taxonomy, phylogeny, morphology and distribution of trees and associated plants.
(d) Application of business methods and technical forestry principles to managing forests.
(e) Measurement of volume, growth, and development of trees and the stands of trees.
(f) Regeneration of forests by natural processes following harvest, or by planting or seeding.
(g) Extraction of pine gum for naval stores.
(h) Principles of forest genetics and the development of superior trees by selection and breeding.

Locations: Beltsville, Md., 1-3, 1-4, 2-2, 3-1, 4-2, 7-2, 8-2, 8-3, 8-5, 9-7, 11-2, 12-3, 13-5, 13-10, 14-3, 14-5, 15-2, 15-5, 16-1, 16-6, 16-8, 17-2, 17-6, 17-17, 18-2, 18-5, 19-3, 19-5, 19-8, 20-4, 20-9, 21-16, 23-2, 23-7, 24-4, 25-2, 26-1, 26-6, 27-1, 27-3, 28-1*, 28-4, 29-6, 30-2, 30-3, 31-1, 31-3, 32-1, 33-1, 35-1, 36-3, 37-2, 38-4, 40-1, 41-3, 42-2, 43-2, 44-6, 46-1, 46-2, 46-3, 46-4, 46-8, 46-18, 47-1, 47-2, 47-9, 47-11, 48-3*, 48-6, 48-12

7.2-Division of Range Management and Wildlife Habitat Research - Studies are concerned with:

(a) Improvement, maintenance and efficient use of range forage on forested and related non-forest range lands used by livestock through better grazing practices, more uniform utilization, and planned use of fire.
(b) Improvement and maintenance of forage production on game ranges.
(c) Relations between forage production and use and timber production and harvest, and between livestock and game use.
(d) Effects of rodents and insects on range forage.
(e) Taxonomy, ecology and physiology of range plants.
(f) Measurement, and evaluation techniques for range lands.

Locations: 8-5, 14-5, 16-6, 17-2, 17-6, 17-17, 20-4, 20-9, 23-2, 33-1, 36-1*, 36-3, 38-4, 39-1, 40-1, 40-6, 41-3, 42-1, 42-2, 42-5, 43-2, 43-6, 44-6, 45-1, 46-1, 46-4, 46-12, 47-2, 47-7, 47-9, 48-4, 48-12

* Funds but no resident personnel

7.3-Division of Watershed Management Research - Studies are concerned with:

(a) The effects of forest and range cover and use upon interception, evaporation, transpiration and storage and yield of water, and on soil stability.
(b) Forest and range soil characteristics as they affect water behavior.
(c) Physical laws governing the relation of precipitation to water and soil movement under natural and altered watershed conditions.
(d) Effects of vegetation on local climates and immediately adjacent environments.
(e) Effects of road, stream channel and other types of structural work upon runoff and erosion.
(f) Developing methods for rehabilitating and improving watershed conditions through mechanical structures and restoration of vegetation for better control of water movements and increased stability of the soil.

Locations: 2-2, 8-2, 8-5, 9-7, 12-3, 14-5, 14-7, 15-2, 16-6, 19-3, 19-7, 20-9, 23-1*, 23-2, 26-1, 26-6, 27-1*, 31-1, 31-3, 33-1, 36-3, 38-4, 39-1, 40-1, 40-6, 41-3, 42-2, 42-5, 43-1*, 43-2, 43-3, 43-6, 44-6, 45-1, 46-1, 46-7, 46-23, 47-1, 47-2, 47-7, 47-11, 48-4

7.4-Division of Forest Products Utilization Research - Studies are concerned with:

(a) The effect of genetics, environmental and cultural factors on the properties of wood for various uses.
(b) Basic anatomical and physical properties of wood and its chemical composition.
(c) Effects of reaction of chemical and physical agents on wood and wood base materials as a basis for process design. Also the properties of agents used in processing and conversion of wood.
(d) Improvement of timber harvesting, conversion and processing and the development of new industrial uses for wood and wood-base materials.

Locations: 8-1*, 8-5, 14-1*, 14-3*, 14-5, 16-1*, 16-6, 20-9, 26-1, 27-2*, 27-4*, 29-6, 30-1, 30-3, 31-1, 36-3, 40-1, 42-2, 43-2, 46-1, 47-2

* Funds but no resident personnel

7.5-Division of Forest Economics Research - Studies are concerned with:

(a) A nationwide survey to determine extent, location and condition of forest lands; the quantity, kinds, quality and availability of timber on such lands; rates of timber growth and mortality, including productive capacity of forest areas; drain on the forest; and improvement of forest survey methods.
(b) Providing data on present and future trends in consumption of lumber, pulp and other forest products, industrial plant capacity, and economic factors affecting consumption of forest products.
(c) Developing improvements in the marketing system for forest products and in price and market information and quality standards for timber and timber products.
(d) Developing markets and expanded uses of low-quality timber, little-used species, logging and milling residues, and new products.
(e) Public and private costs and benefits of various forest practices and means of increasing the productivity of forest land under different conditions; the economic obstacles, and their possible solutions to the practice of forestry; and possible improvements in forest taxation, insurance and credit.
(f) Forest resources, industries and programs of foreign countries; prospects for timber exports; availability of timber imports; and needs for technical forestry assistance in underdeveloped countries.

Locations: Washington, D.C., 2-1*, 8-5, 14-3*, 14-5, 20-9, 25-1*, 25-2, 26-1, 27-1, 31-1, 33-1, 40-1, 43-2, 46-1, 47-2

7.6-Division of Forest Fire Research - Studies are concerned with:

(a) The identification and measurement of the effect of each variable element comprising weather, fuels, and topography, which affects fire behavior on forest and ranges and the prediction of behavior for various combinations of these elements.
(b) The prevention of fires by control of human risks and of hazardous fuels.
(c) The design and planning of fire control organizations and facilities, fire control equipment, and fire suppression methods and techniques.
(d) Fire damage.
(e) Techniques in using fire for silvicultural or range improvement purposes.
(f) The control of weather and vegetation as they may affect inception and behavior of fire.
(g) The relative costs and returns of alternative fire control measures.

Locations: 8-5, 14-5, 16-6, 19-3*, 19-8, 20-4, 20-9, 31-1, 33-1, 38-4, 42-2, 46-1, 46-20*, 47-2, 48-12

* Funds but no resident personnel

7.7-Division of Forest Insect Research - Studies are concerned with:

(a) Individual species of destructive forest insects attacking forest and shade trees, browse plants and forest products.
(b) Insect vectors of tree diseases.
(c) Habits and life histories of forest insects in relation to host trees, and other environmental conditions.
(d) Diseases, parasites and predatory enemies of forest insects.
(e) The causes and prediction of outbreaks of forest insects.
(f) The direct and indirect control of forest insects.
(g) Effective and economical forest insect survey methods.

Locations: 6-2, 7-4*, 8-5, 11-2, 14-5, 16-1*, 16-6, 17-6, 19-5, 20-9, 21-16, 25-2, 26-1, 27-1, 31-1, 31-3, 33-1, 38-4, 40-1, 41-3, 43-2, 44-6, 46-1, 47-1*, 47-2

7.8-Division of Forest Disease Research - Studies are concerned with:

(a) Organisms producing diseases and tree response to pathological and physiological conditions.
(b) Causes and effects of stains and decays of wood in use.
(c) Assistance in selection or development by hybridization of varieties of forest trees resistant to diseases.
(d) Causes and control of seedling diseases in forest tree nurseries.
(e) Ways of reducing damage from exposure or from the introduction of disease resulting from logging damage to residual trees.

Locations: 6-2, 7-4*, 8-5, 11-2, 14-5, 16-6, 17-6, 18-1*, 19-5, 19-8, 20-9, 26-1, 30-1, 31-1, 33-1, 40-1, 41-3, 43-1, 43-2, 43-5* 46-1, 47-1*, 47-2, 48-12

* Funds but no resident personnel

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Organizational code numbers (e.g. 1.31; 4.20, etc.) used in this guide indicate the research groups within the Department working on a specified commodity or group of commodities. See the table of Contents to decipher this code for any research Division, Branch or Laboratory.

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Organizational code numbers (e.g. 1.31; 4.20, etc.) used in this guide indicate the research groups within the Department working on a specified phase of subject-matter. See the table of Contents to decipher this code for any research Division, Branch or Laboratory.

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Organizational code numbers (e.g. 1.31; 4.20, etc.) appearing after the names of towns on the following pages show the Department research groups working at a specified location. See the table of Contents to decipher this code for any research Division, Branch or Laboratory.

Numbers also precede the name of each State and town on the following pages. These are used in pairs separated by a dash (e.g. 43-1; 13-2, etc.) in the section of the publication beginning on page 15. They indicate the State (to the left of the dash) and the town (to the right of the dash) where any specific group has research under way. Headquarter town for the State agricultural experiment station is always given the key number 1. For example, 16-1 stands for Athens, Georgia. See also the large map of research locations on pages 44 and 45.

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2-Cartersville 1.70
3-Watkinsville 1.70
4-Atlanta 2.33*
5-Experiment 1.10, 1.22, 1.40, 1.41, 1.42*, 1.44*, 1.46*, 1.47, 1.48
6-Macon 7.1, 7.2, 7.3, 7.4, 7.6, 7.7, 7.8
7-Fort Valley 1.45, 1.50
8-Cordele 7.1
9-Savannah 1.47, 4.31
10-Fleming 1.70
11-Tifton 1.12, 1.22, 1.30*, 1.31, 1.33*, 1.40, 1.41, 1.42, 1.43, 1.44, 1.46, 1.48, 1.51, 1.53, 1.70, 4.31
12-Albany 1.45, 1.50
13-Cairo 1.43, 1.45

17-Florida
1-Gainesville 1.40, 1.42, 1.44, 1.45, 1.63, 4.32, 4.33
2-Marianna 7.1, 7.2
3-Quincy 1.50*
4-Monticello 1.50
5-Live Oak 1.21
6-Lake City 7.1, 7.2, 7.7, 7.8
7-Olustee 2.31
8-Sanford 1.48
9-Brooksville 1.31
10-Orlando 1.45, 1.48, 1.50, 1.52, 1.53, 4.31

17-Florida (Cont'd.)
11-Merritt Island 1.44*
12-Cocoa 1.43
13-Lake Alfred 1.50
14-Winterhaven 2.30
15-Canal Point 1.43
16-Belle Glade 1.10, 1.41, 1.42, 1.51
17-Ft. Myers 7.1, 7.2
18-Ft. Lauderdale 1.46, 1.48, 1.70, 1.72
19-Miami 1.47, 4.31

18-Alabama
1-Auburn 1.10, 1.11, 1.21, 1.22, 1.41, 1.44, 1.48, 1.63, 1.70, 7.8*
2-Birmingham 7.1
3-Tuscaloosa 3.33*
4-Thorsby 1.70
5-Brewton 7.1
6-Florala 1.51

19-Mississippi
1-State College 1.10, 1.21*, 1.22, 1.33*, 1.40, 1.41, 1.42, 1.48, 1.51, 1.63, 1.70
2-Holly Springs 1.70
3-Oxford 1.72, 2.30*, 2.31*, 7.1, 7.3, 7.6*
4-Jonestown 5.1*
5-Stoneville 1.10, 1.40, 1.41, 1.42, 1.44, 1.48, 1.51, 1.52, 1.62, 1.63, 4.31, 4.33, 7.1, 7.7, 7.8
6-Meridian 1.43, 1.45, 1.46
7-Vicksburg 7.3
8-Gulfport 7.1, 7.6, 7.8

20-Louisiana
1-Baton Rouge 1.41, 1.42, 1.43*, 1.44*, 1.46, 1.47*, 1.48, 1.51, 1.63, 1.70, 4.11*, 4.31*, 4.33*
2-Shreveport (Robson) 1.45, 1.50
3-Tallulah 1.51
4-Alexandria 1.40*, 1.48, 7.1, 7.2, 7.6
5-Bogalusa 1.10, 1.45, 2.31
6-Crowley 1.42
7-Jeanerette 1.30, 1.31
8-Houma 1.10, 1.43, 1.51, 2.30
9-New Orleans 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 3.33*, 4.30, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8

21-Texas
1-College Station 1.13, 1.21*, 1.30*, 1.31*, 1.40, 1.41, 1.42, 1.44, 1.47*, 1.48, 1.51, 1.63, 1.71*, 2.31*, 4.31, 4.32, 4.33
2-Bushland 1.11, 1.71
3-Amarillo 1.31, 1.33*

* Funds but no resident personnel

21-Texas (Cont'd.)
4-Chillicothe 1.40*, 1.42
5-Lubbock 1.10, 1.41
6-Spur 1.31*
7-Hamlin 5.1*
8-Denton 1.42, 1.51, 2.32*
9-Greenville 1.41
10-Stephenville 1.44*
11-Big Spring 1.71
12-Ysleta 1.41
13-Brownwood 1.45
14-Waco 1.51
15-Riesel 1.72
16-Nacogdoches 7.1, 7.7
17-Temple 1.71
18-Kerrville 1.21, 1.52, 1.53
19-San Antonio 2.23*
20-Thorndale 5.1*
21-Beaumont 1.40, 1.42
22-Houston 4.31
23-Galveston 3.33*
24-Harlingen 4.31
25-Weslaco 1.45, 1.46*, 1.48, 1.51*, 1.71, 2.30
26-Brownsville 1.51, 1.53

22-Oklahoma
1-Stillwater 1.10, 1.40, 1.41, 1.42, 1.44, 1.45, 1.47*, 1.48, 1.51, 1.60, 1.63, 1.71, 1.72, 2.11*, 3.33*, 4.11*, 4.31*
2-Goodwell 1.71
3-Woodward 1.40, 1.45, 1.46, 1.48, 1.71
4-Cherokee 1.71*
5-Ft. Reno 1.31
6-Chickasha 1.10, 1.41*, 1.71

23-Arkansas
1-Fayetteville 1.41, 1.44*, 1.51*, 1.63, 1.70, 3.33*, 7.3*
2-Harrison 7.1, 7.2, 7.3
3-Keiser 1.40, 1.44
4-Clarkedale 1.48
5-Marianna 1.41
6-Stuttgart 1.42, 1.48
7-Crossett 7.1

24-Tennessee
1-Knoxville 1.13, 1.31, 1.33*, 1.41, 1.42, 1.43, 1.63, 2.31*, 4.33
2-Springfield 1.43*
3-Greenville 1.43
4-Sewanee 7.1
5-Lewisburg 1.30
6-Jackson 1.48
7-Memphis 4.33*

25-Kentucky
1-Lexington 1.22*, 1.40, 1.43, 1.60, 1.63, 4.11, 7.5*
2-Berea 7.1, 7.5, 7.7
3-Princeton 1.43

26-Ohio
1-Columbus 1.12*, 1.30, 1.44*, 1.46, 1.63, 1.70, 2.20*, 2.23*, 2.32*, 4.33, 7.1, 7.3, 7.4, 7.5, 7.7, 7.8
2-Toledo 1.11
3-Sandusky 1.50
4-Wooster 1.42, 1.50*, 1.51, 1.70*, 2.11*, 4.11*, 4.31*
5-Coshocton 1.72
6-Athens 7.1, 7.3
7-Cincinnati 2.12*

27-Michigan
1-East Lansing 1.10, 1.30*, 1.32*, 1.34, 1.42, 1.43, 1.44*, 1.46, 1.48, 1.61, 1.62*, 1.63, 1.72*, 2.13*, 2.43*, 3.22*, 4.10*, 4.11* 4.31, 4.32, 4.33*, 7.1, 7.3*, 7.5, 7.7
2-Houghton 7.4*
3-Marquette 7.1
4-Ann Arbor 7.4*

28-Indiana
1-Lafayette 1.13, 1.21*, 1.34, 1.37, 1.40, 1.42, 1.44, 1.45, 1.48, 1.51, 1.63, 1.70, 4.32, 4.33, 7.1*
2-Farmland 1.30*
3-Indianapolis 2.11*
4-Bedford 7.1
5-Vincennes 1.50, 1.53
6-Bloomington 1.30*

29-Illinois
1-Urbana 1.13, 1.30, 1.32*, 1.34*, 1.42, 1.44, 1.60, 1.62, 1.63, 1.70, 2.11*, 2.21*, 2.23*, 2.30*, 2.31*, 4.33
2-Chicago 2.11*, 2.42*, 4.30*, 4.31, 4.32*
3-Watseka 4.31, 4.32
4-Peoria 2.20, 2.21, 2.22, 2.23, 2.24, 2.25, 4.30
5-Springfield 1.22
6-Carbondale 1.45, 7.1, 7.4

30-Wisconsin
1-Madison 1.13, 1.21*, 1.30, 1.33*, 1.34*, 1.40, 1.42, 1.43, 1.44*, 1.45, 1.46, 1.48, 1.50*, 1.51, 1.60, 1.63, 1.72, 2.13*, 2.42*, 3.33*, 4.31, 4.33, 7.4, 7.8

* Funds but no resident personnel

30-Wisconsin (Cont'd.)
2-Rhinelander 7.1
3-Wausau 7.1, 7.4
4-Sturgeon Bay 1.45*
5-Appleton 2.20*
6-LaCrosse 1.70
7-Milwaukee 4.32*

31-Minnesota
1-Minneapolis-St. Paul 1.11, 1.12, 1.13, 1.21*, 1.30, 1.40, 1.42, 1.43, 1.44, 1.45*, 1.48, 1.53*, 1.63, 1.72, 2.11*, 2.20*, 2.23*, 2.43*, 3.21, 3.33*, 4.11*, 4.32, 4.33, 7.1, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8
2-E. Grand Forks 1.10, 4.31, 4.32
3-Grand Rapids 7.1, 7.3, 7.7
4-Morris 1.70
5-Dawson 3.21

32-Iowa
1-Ames 1.10, 1.11, 1.12, 1.13, 1.21, 1.32, 1.34*, 1.42, 1.44, 1.46, 1.47, 1.48, 1.51*, 1.60, 1.61, 1.63, 1.70, 2.11*, 2.20*, 3.31*, 4.11, 4.20, 4.31*, 7.1
2-Ankeny 1.51
3-Iowa City 1.60

33-Missouri
1-Columbia 1.11, 1.12, 1.40, 1.42, 1.44, 1.48, 1.51, 1.63, 1.70, 2.21*, 7.1, 7.2, 7.3, 7.5, 7.6, 7.7, 7.8
2-Kansas City 2.43*, 4.33*
3-St. Louis 4.33*

34-Kansas
1-Manhattan 1.13, 1.40, 1.42, 1.47*, 1.51, 1.63, 1.71, 2.24*, 2.43*, 4.31, 4.32, 4.33*
2-Hays 1.42, 1.48, 1.71
3-Garden City 1.71

35-Nebraska
1-Lincoln 1.13, 1.22*, 1.31, 1.40, 1.42, 1.44, 1.47*, 1.48, 1.51, 1.52, 1.60, 1.63, 1.71, 1.72, 2.20*, 4.33*, 7.1
2-Ft. Robinson 1.31
3-Mitchell 1.44, 1.71
4-North Platte 1.71
5-Hastings 1.72

36-South Dakota
1-Brookings, State College 1.40, 1.42, 1.44, 1.63, 1.71, 4.33*, 7.2*
2-Newell 1.71, 1.72
3-Rapid City 7.1, 7.2, 7.3, 7.4

37-North Dakota
1-Fargo 1.42, 1.44, 1.46*, 1.51*, 1.63
2-Bottineau 7.1
3-Minot 1.51
4-Mandan 1.40, 1.45, 1.46, 1.71

38-Montana
1-Bozeman 1.21*, 1.22*, 1.40, 1.42, 1.48, 1.51, 1.63, 1.71, 4.33*
2-Havre 1.71
3-Sidney 1.71
4-Missoula 7.1, 7.2, 7.3, 7.6, 7.7
5-Miles City 1.31, 1.32, 1.40
6-Huntley 1.30, 1.48, 1.71

39-Wyoming
1-Laramie 1.40, 1.48, 1.51, 1.63, 1.71, 2.40*, 7.2, 7.3
2-Sheridan 1.71
3-Cheyenne 1.45*, 1.46

40-Colorado
1-Ft. Collins 1.21*, 1.40, 1.43, 1.46, 1.47, 1.48*, 1.50, 1.60, 1.62, 1.63, 1.71, 7.1, 7.2, 7.3, 7.4, 7.5, 7.7, 7.8
2-Nunn 1.40
3-Greeley 1.46
4-Akron 1.71
5-Denver 1.21, 1.31, 1.48, 4.11*, 4.33
6-Grand Junction 1.71, 7.2, 7.3

41-New Mexico
1-State College, Las Cruces, Mesilla Park 1.10, 1.22, 1.40, 1.41, 1.43*, 1.63, 1.71, 1.72, 4.33
2-Ft. Wingate 1.33
3-Albuquerque 1.22, 1.72*, 7.1, 7.2, 7.3, 7.7, 7.8
4-Tucumcari 1.71*

42-Arizona
1-Tucson 1.13, 1.40, 1.42, 1.46, 1.48, 1.51, 1.54*, 1.63, 1.71, 1.72, 2.13*, 2.31*, 4.31*, 4.33, 7.2
2-Flagstaff 1.48, 7.1, 7.2, 7.3, 7.4, 7.6

* Funds but no resident personnel

42-Arizona (Cont'd.)
3-Glendale 1.34
4-Phoenix 1.50, 1.71
5-Tempe 1.40, 1.41, 1.48, 1.51*, 1.71, 7.2, 7.3
6-Mesa 1.44, 1.46*, 1.51
7-Yuma 1.51, 1.71
8-Wellton 1.44

43-Utah
1-Logan 1.21, 1.22, 1.40, 1.42, 1.44, 1.45, 1.46, 1.48, 1.50, 1.51, 1.62, 1.63, 1.71, 4.11*, 7.3*, 7.8
2-Ogden 7.1, 7.2, 7.3, 7.4, 7.5, 7.7, 7.8
3-Farmington 7.3
4-Salt Lake City 1.43, 1.48
5-Provo 2.41*, 4.11*, 7.8*
6-Ephraim 1.40, 7.2, 7.3

44-Idaho
1-Moscow 1.63, 1.72, 2.41*
2-Dubois 1.33
3-St. Anthony 1.71
4-Aberdeen 1.42, 1.46
5-Twin Falls 1.43, 1.46, 1.48, 1.50
6-Boise 1.71, 7.1, 7.2, 7.3, 7.7
7-Parma 1.46

45-Nevada
1-Reno 1.40, 1.48, 1.52, 1.63, 1.71, 7.2, 7.3

46-California
1-Berkeley 1.40, 1.41, 1.60, 1.63, 1.71, 2.41*, 4.31*, 4.33, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8
2-Klamath 7.1
3-Redding 7.1
4-Susanville 7.1, 7.2
5-Chico 1.47
6-Biggs 1.42
7-Soda Springs 7.3
8-Placerville 7.1
9-Davis 1.10, 1.12, 1.21*, 1.22*, 1.33*, 1.40, 1.41, 1.42, 1.44, 1.45, 1.46*, 1.48, 1.63, 1.71, 3.31*
10-Albany 1.54, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 4.30
11-Menlo Park 2.10*, 4.32*
12-O'Neals 7.2
13-Fresno 1.45, 1.71, 4.31, 4.32
14-Salinas 1.43, 1.44, 1.46, 1.48
15-Shafter 1.10, 1.40*, 1.41, 1.48
16-Bakersfield 1.51
17-Lompoc 1.71

46-California (Cont'd.)
18-Pasadena 1.42, 1.72*, 2.41, 7.1
19-North Hollywood 4.31*
20-Los Angeles 1.41, 1.71, 2.31*, 3.21*, 3.33*, 4.33, 7.6*
21-Whittier 1.50, 1.53
22-Pomona 1.71, 4.31
23-Glendora 7.3
24-Fontana 1.21, 1.33
25-Riverside 1.45, 1.50, 1.54, 1.71, 1.75
26-Indio 1.45
27-Brawley 1.40, 1.41, 1.43, 1.44, 1.45*, 1.46*, 1.71
28-LaJolla 1.46

47-Oregon
1-Corvallis 1.10, 1.40, 1.41, 1.42, 1.44, 1.45, 1.46, 1.48, 1.50, 1.52, 1.63, 1.71, 2.42*, 4.31*, 4.33, 7.1, 7.3, 7.7*, 7.8*
2-Portland 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8
3-Forest Grove 1.11, 1.50, 1.51
4-Hood River 1.45
5-Moro 1.71*
6-Pendleton 1.42, 1.71
7-LaGrande 1.40, 1.48, 7.2, 7.3
8-Ontario 1.71
9-Bend 7.1, 7.2
10-Burns 1.40, 1.48
11-Roseburg 7.1, 7.3
12-Medford 1.45

48-Washington
1-Pullman 1.13, 1.21, 1.40, 1.42, 1.47, 1.48, 1.63, 1.71, 2.41*, 3.33*
2-Mt. Vernon 1.46
3-Seattle 7.1*
4-Wenatchee 1.10, 1.45, 1.50, 4.31, 4.32, 7.2, 7.3
5-Sumner 1.50
6-Olympia 7.1
7-Puyallup 1.13, 1.30*, 1.46*, 1.48, 2.41
8-Yakima 1.50, 1.53, 4.32
9-Union Gap 1.50
10-Prosser 1.40, 1.44*, 1.45, 1.46, 1.48, 1.71, 2.41
11-Walla Walla 1.50
12-Spokane 7.1, 7.2, 7.6, 7.8

Washington, D. C. 1.30, 1.54, 1.60, 1.61, 1.62, 1.63, 2.11, 2.15, 3.20, 3.21, 3.22, 4.10, 4.11, 4.12, 4.20, 4.30, 4.31, 4.32, 4.33, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 7.5

* Funds but no resident personnel

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